DOCUMENT RESUME

ED 079 521 VT 020 705

AUTHOR	Nelson, Richard; And Others
TITLE	A Consortium For Occupational Competency Testing of Trade and Industrial/Technical Teachers. Final Report.
INSTITUTION	Rutgers, The State Univ., New Brunswick, N.J. Dept. of Vocational-Technical Education.
SPONS AGENCY	National Center for Educational Research and Development (DHEW/OE), Washington, D.C. Div. of Comprehensive and Vocational Education Research.
BUREAU NO	BR-8-0474
PUB DATE	Jun 73
GRANT	OEG-2-9-100474-1044
NOTE	197p.
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	Consortia; *National Competency Tests; National Programs; *Occupational Tests; *Performance Tests; *Teacher Evaluation; Test Construction; Testing Programs; Test Results; Trade and Industrial Teachers; *Vocational Education Teachers
IDENTIFIERS	Consortium of States; *National Occupational Competency Testing Institute

ABSTRACT

This report documents the work of the first national effort to design tests for the evaluation of the occupational competency of trade and industrial/technical teachers in 24 major occupational areas. Participating in the project were 717 specialists from industry, education, government, the military, and testing organizations. Tests were developed and administered to 2,010 selected candidates at 24 pilot area test centers established throughout the country. The project proved the feasibility of establishing a permanent National Occupational Competency Testing Institute to be located at Princeton, N.J. Through the Consortium of States, the network of area test centers will provide evaluative services essential to the selection of competent teachers and thus improve vocational education and manpower training programs. Phase I of the project resulted in the organization of a Consortium of States, the preparation of a handbook for developing occupational competency tests, and pilot testing of 24 areas. Phase II developed additional tests and set up scoring techniques and training programs. In Phase III more tests in additional occupational areas were developed, field testing was expanded, and the National Occupational Competency Institute was established. Recommendations for continuing programs and services are presented, and listings of project participants and materials used are appended. (MF)

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Final Report

Project Number 8-0473
Grant Number OEG 2-9-100474-1044

A CONSORTIUM FOR OCCUPATIONAL COMPETENCY TESTING OF TRADE AND INDUSTRIAL/TECHNICAL TEACHERS

Dr. C. Thomas Olivo* – Project Director
Dr. Adolf Panitz – Associate Project Director
Dr. Carl Schaefer* – Principal Institutional Representative
Mr. Richard Nelson*
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Rutgers, The State University
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New Brunswick, New Jersey 08903

JUNE 1973

VT020705

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JUNE 1973

The research reported herein was performed pursuant to a grant from the Office of Education, U. S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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National Center for Educational Research and Development

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FOREWORD

The Consortium for Occupational Competency Testing of Trade and Industrial/Technical Teachers was operated by Rutgers, The State University, under contract with the United States Office of Education. The actual work was carried on under the organizational structure of the National Occupational Competency Testing Project.

Written and performance tests for the evaluation of occupational competency were developed and field tested in twenty-four major occupational areas. Involved in test development were 717 highly qualified individuals from industry (labor and management), vocational education, industrial teacher educators and research and test specialists. In addition, many other persons from the military and testing organizations participated. The tests were administered in a pilot-testing program to 2010 qualified candidates. A network of twenty-four Pilot Area Test Centers was established throughout mainland United States and Hawaii.

The National Occupational Competency Testing Project proved unequivocally the feasibility of establishing a National Consortium of States for Occupational Competency Testing. Forty-four states designated representatives to the Consortium resulting in the formation of a permanent National Occupational Competency Testing Institute. This Institute will continue the program and services identified by the states and will function under the general policy direction of the Consortium of States. The Institute will be located at Princeton, New Jersey.

It was recognized that to affect cooperative action among the states, in addition to the chief school officers for vocational education in the states, other outstanding specialists in the field of trade and industrial/technical education, supervision, Industrial Teacher Education and teaching had to be involved. The planning and administrative committees, the states' designates to the Consortium, and other leadership persons working on the Project represented all areas of vocational education: teacher selection, training, supervision and administration, throughout the United States.

In order to establish occupational competency testing on the broadest possible base, work was carried on with industry, organized labor, Civil Service units on the local, state and federal levels, State Education Departments, the military, as well as public and private organizations interested in and concerned with occupational competency evaluation.

This final report synthesizes the salient elements in planning, procedural organization, test development and validation efforts. It includes information on test evaluation and the structure for a permanent organization for occupational test administration and development. Additional detailed reports containing copies of all forms and special

items used were reported to the U. S. Office of Education in quarterly reports which were provided throughout the Project.

This document brings to a successful conclusion, the first national effort in Occupational Competency Test Development. The achievements of the Project constitute a breakthrough in occupational performance evaluation and established a sound basis for further high quality test development which will result in additional objective evaluative instruments of validity and reliability. Through the cooperative efforts of the Consortium, the network of Area Test Centers will enable the states to avail themselves of evaluative services essential to the selection of highly competent teachers, and, thus, maintain and further improve vocational education and manpower training programs and services.

Within this report many persons are listed to indicate the special nature of their services to the Project. Recognition is made of the Planning Committee who provided overall direction, to the Consortium representatives who caused the Project to function in their respective states, and to the recently organized Administrative Board of the Consortium for their deliberations and action in endorsing the formation of the National Occupational Competency Testing Institute. The Executive Council is cited for accomplishments in four important meetings since their election in moving decisively to incorporate the Institute and in reaching an Agreement with Educational Testing Service to continue the program and services under its direction.

Throughout this effort, Principal Investigators Drs. Melvin Barlow, Richard Nelson and C. Thomas Olivo, with the leadership of Dr. Carl Schaefer, secured the funds necessary to conduct the Project and provided direction and counsel during each successive phase. The Consortium members have recognized the special efforts of Dr. Schaefer and the cooperative arrangements that were made through the Department of Vocational/Technical Education, Rutgers, The State University, to serve as the contract institution.

Thanks are due Dr. Gordon McMahon and State University College at Oswego for providing excellent facilities in Latham, New York as central headquarters. Also, appreciation is expressed to Drs. Byrl Shoemaker, Harry Davis, Thomas Hinds and Ray Rinderer. Through their efforts it was possible to utilize the State Department of Education resources of the Instructional Materials Laboratory at Ohio State University. They provided further input into computerizing many scoring and reporting processes and arranged with National Scanning Service to provide the Project with scoring, analyses, and test reporting capabilities.

Dr. Adolf Panitz, who served as Associate Director, is recognized for substantial contributions which assured the success of the Project at each successive stage of development. Together with Dr. C. Thomas Olivo, the mission was accomplished with distinctive contributions to the profession.

Finally, Dr. C. Thomas Olivo, Project Director, served as the architect applying his foresight and expertise in progressively planning each major activity. Under his leadership the Project which started as a visionary concept resulted in organizing the states into a Consortium with The National Occupational Competency Testing Institute as the permanent organizational structure to continue all programs and services that had been provided throughout the Project.

Dr. Richard Nelson)
Dr. Melvin Barlow) Principal Investigators
Dr. C. Thomas Olivo)

Dr. Carl J. Schaefer
Principal Institutional Representative

New Brunswick, New Jersey
June, 1973

SUMMARY

GRANT NUMBER:	OEG 2-9-100474-1044
TITLE:	A CONSORTIUM FOR OCCUPATIONAL COMPETENCY TESTING OF TRADE AND INDUSTRIAL/TECHNICAL TEACHERS
PROJECT DIRECTOR:*	Dr. C. Thomas Olivo, Professor, Division of Vocational Education, College of Education, Temple University, Philadelphia, Pennsylvania
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PRINCIPAL INVESTIGATORS:*	Dr. Melvin L. Barlow, Head and Professor, Division of Vocational/Technical Education, University of California, Los Angeles, California and Dr. Richard S. Nelson, Program Operations, Chief, Vocational Education, State Department of Education Sacramento, California
INSTITUTION:	Rutgers, The State University, New Brunswick, New Jersey 08903

PROBLEM, PURPOSES, OBJECTIVES

The Project related to the need for developing, testing and validating of objective measures for the evaluation of occupational competence of prospective vocational industrial/technical teachers, and establishing the feasibility of pooling human and material resources and utilizing the products of a Consortium of States efforts.

The controlling purposes of the Project were to:

1. establish the feasibility of a Consortium of States organization to plan, prepare, coordinate, utilize and evaluate the results of written and performance occupational competency tests;

2. coordinate state resources through a national effort which could eliminate much duplication in test development among the states and achieve higher professional productivity while effecting economies;

3. establish the practicality of inter and intrastate working relationships in test planning, development and utilization;

4. develop both written and performance occupational competency tests for potential teachers in 24 major industrial/technical occupational areas;

5. prepare guidelines for test administrators and develop administrative procedures;

6. field test all competency tests and establish the reliability and validity of the tests;

7. prepare interpretive materials reporting candidate results to the respective states;

8. explore the feasibility for and establish a Consortium of States for Occupational Competency Testing; and

9. set specifications and define a model for establishing The National Occupational Competency Testing Institute, organize essential leadership bodies within the Institute and receive Consortium endorsement.

These purposes circumscribed a series of objectives which related to and were accomplished for the three Phases of the Project. The fulfilling of objectives for Phase I resulted in:

A. The organization of a Consortium of States;

B. A comprehensive survey of the state-of-the-art (literature and observed materials and practices) of occupational competency testing;

C. The preparation of a Handbook for developing occupational competency tests;

D. A comprehensive analyses of one major industry constellation and one technical occupation constellation; and

E. The development, testing and assessment of two pilot competency tests (one written - one practical) for each of the two major occupational constellations.

Phase II resulted in the:

A. development of competency tests in ten other selected trades and/or industrial/technical occupations, including guidelines for using the tests, scopes, scoring and other materials for test administrators, examiners and examinees;

B. establishment of reliability and validity of the tests;

C. development of uniform scoring techniques and interpretive comparative materials relating to test results applicable to participating states;

D. setting up a training program to develop a cadre of test administrators, test developers, and examiners; and the

E. exploration of the feasibility of a National Occupational Competency Testing Institute for test development, reproduction, administration, scoring, statistical analysis and reporting of test results to the states.

Phase III achieved the objectives of:

A. extending the development, testing and analysis function to include twelve additional trades and/or industrial/technical occupational constellations;

B. expanding field testing through twelve new regional Test Centers with additional multi-state test administrators, developers and examiners;

C. structuring a plan for the organization and administration of the National Occupational Competency Testing Program that was approved by the Consortium of States;

D. establishing the National Occupational Competency Testing Institute as a permanent organization to serve the Consortium and Institute membership, including legal incorporation with Constitution, By-laws and Operating Policies;

E. assessing proposals from professional groups and agencies to continue the program and services, maintaining the integrity of the whole effort, processes and products, and under the control and administrative direction of the N.O.C.T. Institute (Consortium); and

F. contracting with a selected organization to continue all activities, programs and services on a permanent operational base.

PROCEDURES AND ACTIVITIES

Rutgers University served as the control center of the National Occupational Competency Testing Project under direction of Dr. Carl Schaefer. Dr. C. Thomas Olico, the Project Director, provided administrative leadership and served in planning the major activities, establishing procedures, and structuring a permanent organization. Dr. Adolf Panitz, as the Associate Director, provided professional services in implementing the plans, designing the products, and contributing significantly to the achievement of the objectives of Phases I, II and III.

With the remaining principal investigators: Dr. Carl Schaefer, Dr. Richard Nelson and Dr. Melvin Barlow, assisted by a Planning Committee of outstanding, knowledgeable vocational educators, these leaders served in the overall planning, coordination, management, promotion, establishment of advisory councils and the development of initial operating procedures with additional input provided by the U. S. Office of Education Project Officer.

Written and performance tests were developed in twenty-four major industrial occupations areas. Twenty-four interim Pilot Area Test Centers were established in strategic locations throughout the United States with each Center administering at least ten of the twenty-four tests for field testing purposes. Each of the tests was developed under the direction of a Pilot Area Test Coordinator who had demonstrated a capability to bring competent occupational specialists together and to get maximum interaction and output. The efforts of these coordinators were supplemented by the Project Director and Associate Director through group and individual conferences. Outstanding resource people from industry (management, craftsmen, and labor organizations), industrial teacher training programs, military test personnel, and others contributed their knowledge and experience to the test development and administration. The Pilot Area Testing Centers were located to provide easy access for the occupational competency testing of candidates from other states.

PROJECT ACCOMPLISHMENTS

The National Occupational Competency Testing Project:

- Established the practicality of forming a Consortium of States for purposes of planning, developing, administering a National Occupational Competency Testing program and conducting research and related activities;

- Achieved acceptance by the states of occupational competency tests prepared and administered according to a National Plan which represented the collective efforts of the states to validate the occupational competence of prospective vocational industrial/technical teachers;

- Further established that the states are concerned about the reliability and validity of occupational competency tests, their limited resources to develop such tests, and the value of forming a Consortium;

- Proved that a National effort is practical, eliminates duplication of effort, produces higher quality, reliability and validity of test, and effects substantial economies;

- Demonstrated the practicality of making multi-level occupational competency analyses on an acceptable nationwide basis;

- Produced comprehensive analyses of twenty-four major industrial areas, which resulted in the development of written and performance tests and field testing of these tests in twenty-four regional locations;

- Completed the most comprehensive literature survey and on-site observation study of efforts by public institutions, private industries, military, labor unions, and other organizations and reported the findings in "The State-of-the-Art of Occupational Competency Testing";

- Prepared a "Handbook for Developing and Administering Occupational Competency Tests", as well as, "Directions For Area Test Center Coordination, Test Development, and Test Administration", explanatory popular brochures, a project summary pamphlet, and other needed materials;

- Provided occupational competency testing service to the Consortium of States by actually testing candidates through multiple-state arrangements;

- Developed uniform scoring techniques, guidelines for administering tests, statistical analyses, reporting back to the states, and prepared interpretive materials by which each state may establish its own standards; and

- Established a National Occupational Competency Testing Institute and arranged for continuation of the program and services of the Project under a permanent organization for the Consortium of States.

The Project included the work and participation of 717 resource and consultant persons, test developers, test administrators and performance examiners, Principal Investigators, Project Staff and Planning Committee. In addition, another 2010 selected candidates who took the tests participated.

RECOMMENDATIONS

Currently, forty-four (44) states have designated a Consortium representative to participate in the National Occupational Competency Testing Project. Twenty-eight (28) of these states have committed themselves to financial support. However, to provide adequate occupational competency testing services, it is recommended that the remaining six states designate a Consortium representative, all states declare their intent to support the National effort financially, additional Testing Centers be established, and a permanent N.O.C.T. Institute be formed to more adequately serve the Nation.

While a breakthrough has been achieved with the first twenty-four tests, additional occupational competency tests are needed to cover the whole spectrum of trade and industrial/technical education. It is recommended that the testing program be expanded through National effort to cover all occupational areas in trade and industrial/technical education. Further, exploration of similar testing services in the other vocational fields be continued, considering the models developed for such expansion.

Finally, it is recommended that greater public relations efforts be planned and executed to recognize the essentiality of bona-fide on-the job work experience as a prerequisite for quality teaching in vocational education.

Chapter I

INTRODUCTION

A. The Problem

• For an industrial nation which constantly accelerates its technological skills and knowledge, the rate of growth depends upon the productive potential of the available labor force. Leaders of the industrial sector of the nation and those concerned with the utilization of the products and processes of industry, recognize that the socio-economic well being of the people, their health, and the national security are inseparable from manpower development.

For some, this means preparation for initial employment. Others in the labor force may require upgrading so that they may perform at levels requiring higher skills and technical knowledge, or serve middle management functions as foremen, supervisors or managers. Finally, there are those who need to be retrained in order to prepare for employment in other occupational areas.

Whether vocational education relates to the preparation of youth, new workers, or the retraining or upgrading of adults; whether the training is carried on in educational institutions, industry, by unions or the military; there is a force, common to all, to make the potential manpower actual manpower. That force is the occupational competence of those who serve as teachers.

• With the continuing labor force growth and training demands on vocational education, the need for occupationally competent tradesmen and technicians to enter the field of teaching is critical. The level of competence of the teacher is the keystone upon which the whole instructional program is built. While it is essential that the prospective teacher possess the personal qualities which are fundamental to teaching, there must also be evidence that the range of occupational competence is adequate to meet the full spectrum of the needs of youth and adults, as well as those of industry.

There has been a growing concern over the need of measures to accurately evaluate occupational competency. This concern has been expressed by school administrators, industry, labor, the military, teacher educators, state officials responsible for certifying teachers, and others. Standards have been sought by which to judge teaching/learning effectiveness in terms of skill and related technical competencies.

• Experience has shown that the quality of instruction, whether for a beginning learner or advanced craftsman or technician, depends directly upon the occupational competence of the teachers. Thus, the need for instruments for the evaluation of the practical skills and related technical competence of potential teachers becomes obvious.

Without objective measures of occupational competency, it is impossible to ascertain whether the prospective teacher possesses the broadly-based level of competency essential for effective teaching. The state-of-the-art search revealed a number of states require the successful passing of trade competency examination as a requirement for certification.

Further, such tests were largely of the paper and pencil variety, although some required actual performance in simulated job situations. Most had been constructed by vocational education teachers and/or skilled craftsmen with varying degrees of professional background in educational measurement. Limited opportunity had been provided to use such accepted test development practices as pre-testing test items, validation, reliability of scores, or the objectivity and dependability of scoring procedure.

The observations about the quality of existing examinations were further reinforced during a seminar on the "Feasibility of Providing Occupational Competency Examinations on a National Basis", held at Rutgers University in September and November, 1966. Participants, representing twenty-three states, repeatedly told of the difficulties encountered in trying to build such examinations without adequate budget or professional staff. They pushed toward a nationally coordinated effort to develop occupational competency examination as being urgently needed. They recognized that such coordination would reduce, or eliminate, much duplication and would produce more valid and reliable measures. Almost unanimous agreement was expressed that such examinations would be widely used.

B. Objectives of the Project

1. Overall Objectives

The overall objectives of the Project were focused upon three main areas:

(a) To establish a Consortium of States for purposes of planning and administering occupational competency tests and conducting related research,

(b) To develop uniform procedures for test construction and administration on a National scale; construct and field test written and performance tests in selected major industrial occupational areas in a National network of area testing centers; and establish reliable and valid measures of occupational competency, and

(c) Establish a permanent National Occupational Testing Institute for the reproduction, distribution, scoring and reporting of test results with potential to provide new and related programs and services.

2. Specific Objectives

The scope of the Project consisted of three Phases each concerned concurrently with the final achievement of the overall objectives.

- The specific objectives of Phase I included:

  (a) To research the State-of-the-Art of Occupational Competency Testing,

  (b) To prepare a Handbook for the development and administration of occupational competency tests,

  (c) To develop and pilot test two comprehensive examinations in two major industrial occupational areas,

  (d) To establish occupational and job analyses procedures, and

  (e) To explore the feasibility of establishing a Consortium of States for test planning and development and the administration of a National Competency Testing Program.

- The specific objectives of Phase II included:

  (a) To determine the major industrial occupational areas for which tests should be developed,

  (b) To develop written and performance tests in ten major industrial occupational areas, including the Scope of the Examination, evaluative scales, and other directions to examiners, test administrators and examinees,

  (c) To establish and provide a training program to develop a cadre of test administrators and performance examiners in ten different regional Centers,

  (d) To field test each of the ten tests in the ten regional test Centers; to establish validity, reliability and the practicality of implementing the test procedures,

  (e) To provide occupational testing services to the Consortium of States by actually testing candidates through multiple states arrangments,

  (f) To explore the feasibility of establishing a National Occupational Competency Testing Institute for planning, developing, reproducing, administering, scoring, making statistical analyses and reporting of test results, and

(g) To develop uniform scoring techniques and guidelines for administering tests and the preparation of interpretive materials for establishing acceptable standards.

- The specific objectives of Phase III included:

(a) To extend the development, testing and analyses functions to twelve additional major trades and/or industrial/technical occupation constellations,

(b) To carry on field testing in twelve new pilot regional test Centers with additional multi-state administrators, developers and examiners,

(c) To structure an acceptable plan for the organization and administration of the National Occupational Competency Testing program under a permanent Consortium of States organization,

(d) To terminate Phases I, II and III of the Project with a feasible and acceptable plan to transfer all functions, responsibilities, processes and products to a permanent Consortium of States organization, and

(e) To solicit and assess proposals from professional groups and agencies to continue the program and services, maintaining the integrity of the whole effort, processes and products.

C. Anticipated Outcomes

1. The objectives of the Project provided the direction in which the work was to be carried on. The following outcomes were set as the expected goals by the Principal Investigators, Planning Committee, and the Project Staff.

(a) Through a National effort of the states achieve the professional and financial support for a National program of occupational competency testing,

(b) Identify, apply or develop new practical procedures for the development and administration of occupational competency tests which would serve as models for further test development,

(c) Establish a National Competency Testing Institute to carry on the National Occupational Testing Program and perform all related services,

(d) Develop a battery of written and performance tests in twenty-four major industrial occupational areas which would constitute the foundation for the National Occupational Competency Testing Program,

(e) Develop plans and procedures for continuing leadership in occupational competency testing, and

(f) Solicit the cooperation of all the states to accept and apply the results of the National Occupational Competency Testing Institute towards the professional improvement of the vocational teaching profession.

D. General Plan of Operation

1. A knowledgeable decision-making team of outstanding individuals, with a deep interest in the quality of vocational teachers and concern with the development in human potential through vocational education, served in a cooperative effort to:

(a) Search out and incorporate the best-tested experience and practices to define and establish an occupational competency testing program,

(b) Identify qualified individuals to serve as Pilot Area Test Coordinators,

(c) Locate Pilot Area Test Centers in accessible geographic locations where expertise and excellent testing facilities were available,

(d) Coordinate into cooperative procedures the efforts of the states through a Consortium of States,

(e) Assist in the establishment of a National Center for occupational competency testing to effect greater efficiency and economy, and

(f) Provide plans and procedures for developing leadership in occupational competency testing.

2. Test construction and content determinations must be based on the analysis of occupational clusters. These require a combination of occupational competence and expertise with testing practices. Therefore, committees of selected occupationally qualified persons served in determining the scope of the examination and occupational competency to be evaluated. Test specialists assisted in test item writing and test organization. Committee members included representation from industry, teachers and test specialists.

3. Test evaluation was planned to include pilot testing and evaluation of each test by specialists and educational measurement organizations knowledgeable about test administration and administration.

4. A program of pilot testing in widely distributed Area Test Centers provided necessary test data for statistical analysis and evaluation.

5. Conferences and work shops with test administrators and test item writers and the Project Staff provided uniform practices and procedures.

6. A continuing program of conferences between the Project Staff, Principal Investigators, Planning Committee, Consortium of States Representatives, Administrative Board and Executive Council resulted in the establishment of policies and the formulation of procedures for a permanent continuation of the Project in the form of the National Occupational Competency Testing Institute.

Chapter II

RATIONALE, METHODOLOGY AND PROCEDURES

A. A Survey of the State-of-the-Art of Occupational Competency Testing

1. Observation of Occupational Competency Testing Efforts and Materials

The searching out, analyzing and synthesizing of elements that provide a common thread of philosophy, purpose, organization and methodology formed the foundation for test development and construction. Communications were established with educational professional groups and organizations such as Research Coordinating Units, the Trade and Industrial Education Division (AVA) Research Committee, The National Association of State Supervisors of Trade and Industrial Education, The National Association of Industrial/Technical Teacher Educators, The National Association of State Directors of Vocational Education, private testing and evaluation services, government testing units, the Civil Service, industry, labor and the military. Field visitations to existing programs and testing installations were made by the Project Staff.

2. Search and Analysis of Literature

The observations and materials obtained from these sources were supplemented by an extensive search and analysis of the literature. The resulting synthesis with conclusions and recommendations for occupational competency testing are included in a separate publication "Report on the State-of-the-Art of Occupational Competency Testing" which has been distributed to state directors, industrial teacher educators, Consortium representatives, area test coordinators and other individuals involved in the work of the N.O.C.T. Institute.

3. Identification of Resources

It was generally known that some work had been done in the development and use of performance tests, simulation techniques, and written tests intended to measure occupational competency. Unfortunately, the information was not generally accessible, having been reported independently---not indexed in standard bibliographic sources. The following sources were identified as most promising:

(a) For the Search of the Literature

Outstanding libraries, accessible to the Project Staff and within reasonable travel distances, were identified; Libraries of Columbia University, New York University Library - University Heights Campus, New York City Central Library, the Library of the New York State Education Department, the Library of Congress, Library of Cornell University---School of Industrial and Labor Relations, The Center for Studies in Vocational Technical Education, Ohio State University, and The Center for Studies in Vocational and Technical Education---Wisconsin University.

(b) Professional Organizations

The publications of the following professional organizations were identified as possible sources of information: American Psychological Association, Research Committee of the American Vocational Association, National Council for Measurement in Education, the Military Testing Association, and others.

(c) Chief State Officers for Vocational Education

State Directors of Vocational Education and supervising/coordinator personnel in appropriate bureaus under their direction were designated as primary sources for information.

(d) State Vocational Research Centers

Directors of the National Research Centers for Vocational Education and State Research Coordinating units were contacted.

(e) Head State Supervisors and Teacher Educators in Trade, Industrial and Technical Education Programs

A good deal of work in teacher certification and occupational competency testing was carried on by State Supervisors and/or Industrial Teacher Educators. They were, therefore, designated as potential sources of information.

(f) Professional Organizations Relating to Vocational Education and Manpower Development

The National Professional organizations relating to any aspect of professional development or evaluation were reviewed and utilized.

(g) Government Agencies - Military

The Department of Defense and the Office of Naval Research have developed tests and carried on occupational competency testing. Thus, military centers and installations were identified for on-site observation and conferences (Appendix C).

(h) Government Agencies - Civilian

Work was done in the appraisal of the level of competency among unemployed craftsmen, before and after World War II, by various government agencies concerned with employment and manpower (Appendix C).

(i) Private Organizations in the Field of Testing

Among private organizations, the Educational Testing Service, Princeton, New Jersey and the Psychological Corporation are most widely known for their work in testing and educational measurement. These two, and other testing organizations, were selected for direct contact. A complete list of such organizations is given in Appendix C.

(j) Industries, Trade and Industrial Organizations, Organized Labor

Occupational competency appraisal is carried on in industry. Such organizations as the American Management Association and the Industrial Conference Board are concerned, too, with the appraisal of occupational competency of workers.

A number of labor unions conduct apprentice training programs and have included in their contract, provisions for appraising journeymen competence. The unions, industrial firms and trade and industrial organizations selected for contact are given in Appendix C.

(k) Civil Service Units on the National, State and Local Level

One of the oldest establishments concerned with Occupational Competency Evaluation was the Civil Service. The various branches and levels of the Civil Service contacted have been listed in Appendix C.

4. Method of Contact

(a) Contact by Mail

Contacting such a large number of people and institutions required a basic approach through letters with a rationale describing the purpose and scope of the National Occupational Competency Testing Project (Example of letters and rationale are appended (Appendix C). In addition, descriptive brochures for Phase I and II/III were mailed to interested individuals, institutions, organizations and agencies.

(b) Personal Visitations

It became apparent, early in the Project, that first-hand concrete information on existing practices had to be obtained through personal observation and discussion with responsible individuals involved in the development of occupational competency tests and their administration. A number of military installations, Civil Service centers and industries extended invitations and were visited. In order to maintain uniformity and consistency of observation, a guide was prepared and utilized (Appendix C).

Contacts were also made within professional organizations through the vice-presidents of the various divisions of the American Vocational Association and the officers of special organizations in the Vocational Education.

5. Nature of Information Requested

The following basic information was requested:

- A list of occupational competency tests which had been prepared for various occupational areas,
- A list of tests in preparation,
- Plans for future development of occupational competency tests,
- Samples of written and performance parts of occupational competency tests,
- Guidelines for the construction of new competency tests,
- Instructions for examiners and examinees,

- Methods of evaluating, utilizing results and relationship to credentials and collegiate recognition of occupational competence, and

- Interest in cooperatively pooling human and material resources in a national effort.

6. Sampling of Information Received

A total of 219 requests were made and 127 responses received, dealing with various aspects of occupational competency testing. The respondents identified seventeen states that used some form of occupational competency testing, four additional planned to do so in the future.

The survey revealed a startling duplication of effort. The results were reported in detail in the separate report on the state-of-the-art. At this point, suffice it to say, that 20 centers in 16 states prepared tests for the machine trades, 15 centers did the same for auto mechanics, followed by 12 in electrical installation, etc.

Tests were used for industrial teacher certification, for admission to industrial teacher education programs, and for advanced collegiate credit. Occupational competency test results are used for a single purpose or in various combinations differing among the several states.

B. The Consortium of States for Occupational Competency Testing for Trade and Industrial/Technical Teachers

Phase I of the Project demonstrated with crystal clearness the feasibility for organizing a Consortium of States for the purpose of planning, developing and administering occupational competency tests and carrying on related research.

Such a Consortium was organized in Chicago in May 1971 with representatives from thirty-two states. Preliminary guidelines relating to an organizational structure for the Occupational Consortium were considered by the Principal Investigators, the Planning Committee, and by leading states. Alternate plans, relating to the feasibility of bringing the states together, possible commitments and obligations, management and organization pattern, establishment of a representative Administrative Board, matters that relate to planning, test development, reproduction, distribution and accounting, testing services to be provided, public information and reporting, and research activities were crystalized. The interest of the states continued to grow. By 1971, forty-four states had designated representatives to the Consortium (Appendix A).

The organization of the Consortium involved much educational effort and constant communication. The major meetings and conferences that guided all the Project efforts follow in chronological order.

1. Meetings of the Planning Committee

The Planning Committee met on July 14-15, 1969 in Los Angeles and provided advice and counsel to the Project Director (Dr. C. Thomas Olivo) and the Associate Director (Dr. Adolf Panitz). Suggestions were made regarding current occupational competency programs: the assessment of national efforts in education, the military, industry, civil service and other agencies, the identification of two occupational areas for the pilot projects (electronics occupations: communication, and machine industries occupations); project visibility and committee responsibility in reporting nationally, and the development of a Consortium plan.

2. Council Meeting at AVA Convention: Boston, December 1969

The Council met during the American Vocational Association National Convention in Boston on December 6, 1969. At that time, the directors reported on the progress of the survey of the state-of-the-art of occupational competency testing, presented the pamphlet describing the goals and objectives of the Project and reprints of an article, "A Breakthrough in Occupational Competency Testing" which had appeared in the October issue of The American Vocational Journal. A summary of the progress of the work of the Project was mailed to all state directors of vocational education, and to the head industrial teacher educators. The Council approved an outline for the Handbook and the approach developed for constructing the pilot tests.

3. Conference of Principal Investigators and Project Directors

Preliminary to a meeting of the states' representatives, to form a Consortium, a telephone conference was held on January 31, 1970 in which the four principal investigators and the Project Staff participated. Basic concepts for the Consortium were discussed, an agenda established and agreement reached for a meeting of State Directors or a designate state representative in a central location.

4. Consortium Meeting of States: Chicago, March 12-13, 1970

Thirty-eight state Directors or their representatives attended, representing thirty-two states, Puerto Rico and Hawaii. (The invitational letter and list of states and representatives

appear in the Appendix A. A presentation by Dr. C. Thomas Olivo concerning the need for a Consortium and possible patterns of organization was followed by extensive discussion.

Dr. Adolf Panitz presented the findings of the survey of the state-of-the-art of occupational competency testing. Of particular interest to all participants was the tremendous duplication of effort in test development and the extreme range of the quality of the tests which had been submitted to the Project for analysis. The conclusions of this meeting were summarized in two memoranda.

There was nearly unanimous agreement for support of the Project. The Principal Investigators were urged to carry on efforts to obtain further financial support from the U. S. Office of Education to continue Phases II and III. Letters of support were received. The interest aroused in this Project was further demonstrated by the designation of thirty-two individuals to serve on a National Consortium Committee for Occupational Competency Testing and to maintain liaison between the Project and their representative states.

5. Meeting of Consortium Committee, Planning Committee, Principal Investigators and Staff: American Vocational Association Convention, New Orleans, December 1970

At this meeting, completion of the work of Phase I of the Project was reported. The Principal Investigators, Planning Committee and Staff planned major activities to assure continuation of Project efforts. The Staff discussed the completed work as reported in the Interim Report to the U. S. Office of Education. Included were such items as the results of the machine trades and electronics (communications) tests, the materials distributed to the State Directors and Consortium Representatives, the State-of-the-Art survey, and the "Handbook for the Development and Administration of Occupational Competency Tests".

Presentations were made later to the Research Committee of the Trade and Industrial Research Division and the National Association of State Directors of Vocational Education.

6. Meeting of the Principal Investigators, Planning Committee and Staff: St. Louis, April 12-13, 1971

Plans were made in St. Louis to establish Area Test Centers and solicit assistance in identifying persons qualified to serve as Area Test Administrators. Assignments and schedules were determined and contacts made for such services. A summary of the proceedings (Appendix D) shows the determination made regarding Area Test Centers, Test Administrators, schedule, possible contractual relations, and other operational details. Based on an analysis of need, priorities were established and accepted for the next ten occupational competency test areas as required in Phase II. The Planning Committee concurred in the determination to develop tests for selected major industrial areas.

7. Meeting of Consortium Representatives, Principal Investigators, Planning Committee and Staff: St. Louis, May 25, 1971

The Consortium Representatives were advised of the need to work cooperatively toward pilot testing the ten occupational competency tests in ten major Area Test Centers throughout the United States. Further plans were considered for a working format for the Consortium of States. Again, the schedule, purposes and outcomes of the meeting were included in the Quarterly Reports. The Staff reported on occupational analysis and test development, schedules and contract arrangements with ten cooperating Test Administrators. (An example of contract is given in Appendix E.)

Contractual arrangements were made with the Ohio Instructional Materials Laboratory to reproduce, distribute, score, tabulate and analyze the results of the examinations and report the results to the Pilot Area Testing Centers. Approval was also given for the organization of an Administrative Council, with members to be elected by the Consortium members in each of the ten regions established by the U. S. Office of Education.

8. Meeting of Principal Investigators, Planning Committee, Consortium Representatives and Staff: American Vocational Association Convention, Portland, December 5, 1971

The priorities which resulted from an analysis of need for Phase II were extended to include twelve additional major occupational areas for which tests were to be developed in Phase III. The Planning Committee, Staff and Principal Investigators concurred that foundational work for Phase III should be started during Phase II. Contracts were negotiated for tests in those areas. Pilot Area Test Centers were located in twelve additional states

bringing the final total to 22 states. Presentations on the progress of the National Occupational Competency Testing Project were made at this convention to the National Association of State Supervisors of Trade and Industrial Education, the Trade and Industrial Education Research Committee and in several other meetings of the Trade and Industrial Education Division.

9. Meeting of Principal Investigators and Staff: Santa Monica, July 6-8, 1972

The work of the Project was assessed and the Staff directed to continue exploration and work toward the organization of a National Occupational Competency Institute to function under a permanent organization of the Consortium of States.

10. Meeting of Principal Investigators, Staff and Committee of State Directors of Vocational Education: Columbus, August 17-18, 1972

Plans were discussed for State Director of Vocational Education representation on the Administrative Board of the National Occupational Competency Institute (discussed at that time as a Governing Board).

11. Meeting of the National Association of State Directors of Vocational Education: Columbus, September 1972

Presentations were made by the Principal Investigators and Staff on the progress of the Project (Appendix F). Further active support of the Project and the establishment of a permanent organization was solicited from the State Directors. A follow-up progress report was mailed to the Directors and Consortium Representatives.

12. Meeting of Consortium Representatives, Principal Investigators, Administrative Board, Planning Committee and Staff: American Vocational Association Convention, Chicago, December 1972

Further efforts were discussed, and unanimously endorsed, to establish a permanent organization for occupational competency testing through a Consortium of States. All Consortium members present were advised as to their share in a plan to equitably support a permanent Institute and the program and services that would be provided in accordance to the level of individual state support.

The first Administrative Board meeting was held with elected or designated representatives of the regions, the Principal

Investigators and the Project Staff. An Executive Council was elected by the Board and started functioning at that time.

Subsequent to the meeting, proposals were solicited to identify a contract organization that might serve the permanent N.O.C.T. Institute to continue the program and services provided by the Project when it terminated. Interested organizations included The Educational Testing Service, Princeton, New Jersey; Psychological Corporation, New York, New York; Dunwoody Industrial Institute, Minneapolis, Minnesota; Eastern Michigan University, Ypsilanti, Michigan; The Center for Vocational and Technical Education, Columbus, Columbus, Ohio; The Instructional Materials Laboratory, Ohio State Department of Education, Columbus, and others. An example of the Proposal Request appears in the Appendix G).

13. Meeting of the Principal Investigators, Staff and Executive Council: Rutgers University, New Brunswick, February 20-21, 1973

The first meeting of the Executive Council of the Administrative Board for the Consortium of States organization was devoted to further consideration for the establishment of a permanent N.O.C.T. Institute. Proposals for conducting the program, services and activities defined for the Institute were evaluated by means of an established guide (Appendix G). A proposed Constitution with By-laws, Articles of Incorporation and Operating Policies for a permanent N.O.C.T. Institute and its operational structure were discussed. A proposed progress report was approved for distribution among State Directors, State Representatives to the Consortium, Head, Trade and Industrial/ Technical Supervisors and Teacher Educators, and Pilot Area Test Coordinators.

14. Meeting of the Executive Council, Administrative Board, Planning Committee, Principal Investigators and Staff, Las Vegas, April 8-9, 1973

The major focus of this meeting was on the operational structure of the National Occupational Competency Institute, procedures to be followed for incorporation, the Constitution and By-laws and Operating Policies and Procedures. These items were approved and the Staff and the Executive Committee were authorized to establish a permanent N.O.C.T. Institute organization and to negotiate a contract to continue the program and services that were approved at an earlier date.

Record was made of the expertise and continuous guidance and support of the Planning Committee whose terms expire with the completion of the Project.

15. Meeting of the Executive Council: New Brunswick, May 23-24, 1973

Final revisions of the Constitution, By-laws and Operating Policies for the National Occupational Competency Testing Institute were approved for ratification by the Consortium at its annual meeting in Atlanta in December 1974.

The draft of an Agreement between the permanent N.O.C.T. Institute and Educational Testing Service was assessed. Suggested changes were to be negotiated and a contract consummated after legal clearance.

The Executive Council, comprising the four Principal Investigators, the Council Officers and the Associate Project Director were incorporated as the N.O.C.T. Institute and constituted its first Board of Trustees.

C. The National Occupational Competency Testing Institute

1. Temporary for Duration of Project

Contractual arrangements were made with the Ohio State Education Department, Instructional Materials Laboratory, to reproduce, distribute, score, tabulate and report to the Pilot Area Test Centers the results of the examinations. Additional data were provided to the Central Office to establish reliability, validity, etc., and for further diagnostic purposes. Working arrangements were made for the orderly requisition of tests by the Pilot Area Test Center Administrators and for the security of the examinations.

2. Permanent National Occupational Competency Testing Institute

Under the guidance of the Planning Committee, Administrative Board, Executive Council and the Principal Investigators, the Staff prepared the necessary materials to establish a permanent Institute and to contract for programs and services as requested and approved by the Consortium.

D. Reference and Guide Materials for Test Development and Administration

The thorough search of the literature and numerous professional contacts to secure appropriate materials to assist test developers in occupational competency test construction, especially pertaining to performance test, produced limited results. A number of states had prepared outlines, statements of purposes and administrative procedures. Nearly all these publications concentrated on certain fragments

such as test item writing, performance tests, administration of tests, etc. No publication was available which presented a systematic, rational approach to occupational competency test development.

Since no Handbook or adequate guides (dealing with the development of written and performance tests, test administration, test interpretation and for evaluating occupational competency tests) were located, it was necessary to prepare such a "Handbook". The findings resulting from the state-of-the-art survey, observations of the Staff during field visits, the experience gained during the planning, development and field testing of two pilot tests, and the most up-to-date practices and theoretical concepts were interwoven into a coherent pattern which would be of practical use to test developers, test administrators and Area Test Center coordinators.

1. Handbook Content

As the title implies, the "Handbook" prepared for the Project, with potential for continuous use, was intended to assist in the development, administration and evaluation of written and performance tests. The "Handbook" is organized in four parts:

Part I provides the historical background and philosophical concepts of occupational competency testing. These relate to the selection of tradesmen and technicians from industry for teaching in vocational programs; the nature of written, performance and oral tests, and their advantages and disadvantages.

Part II is concerned with test development procedures, the personnel involved in actual test construction and examples of test items for written and performance tests.

Part III describes the general procedures for test administration.

Part IV deals with the evaluation of occupational competency tests and test results.

The contents of this Handbook, particularly the recommendations, reflect a careful synthesis interpreted against many years of practical work in occupational competency testing by the Project Director and Associate Director.

2. Distribution of Handbook

The "Handbook" was prepared for and distributed to all Pilot Area Test Administrators, Test Item Developers, Advisory Committee Members, State Directors of Vocational Education, State Representatives to the Consortium, Principal Investigators and Planning Committee, It was, also, made available to other interested participating individuals and the major libraries.

3. Directions for the Administration of Occupational Competency Tests

For accurate evaluation of test results, it was essential that all parts of the tests be conducted under similar conditions. This was especially important when the tests were to be conducted in widely separated and different geographic locations. It was, therefore, necessary to develop specific directions for candidates and Examiners.

(a) Directions to the Candidate

The candidate should be provided with information on what he is expected to demonstrate, the procedures he is expected to follow, and such other details as place and time of the examination. The Scope of the examination which is provided for the candidate sufficiently ahead of the examination date contains an outline of the major areas, both written and performance, the approximate proportion of test items for each area in the examination and what the candidate is expected to bring to the written and performance examination. A typical example of a "Scope" is given in Appendix H.

(b) Directions to the Examiner

Specific direction concerning the Administration of the written and performance tests have been provided in the "Handbook for Developing and Administering Occupational Competency Tests". Additional information is provided to guide the Examiner in preparing the physical facilities: tools, equipment, supplies required for each occupation, etc.

The scoring for the written examination was done electronically. Performance evaluations occur while the candidates demonstrate skill capability by carrying out the assignments of the performance test. To assure as much objectivity as possible and have the Examiner judge the same factors in the performance of all candidates regardless

of geographic location, performance evaluation forms were developed for all examinations. An example is given in Appendix H.

4. Directions for Area Coordination, Test Development, Test Administration

(a) The Area Test Center Concept

Pilot area occupational Test Centers served as regional locations for the National Occupational Competency Testing Project. Each Center developed one or more written and performance tests for a selected occupation.

The overall responsibility for developing the written and performance parts of a test rested with the Area Test Center Coordinator. He carried on the work beginning with the organization of a planning committee, test development, and field testing the occupational competency test developed by the Pilot Center and nine other tests developed in other Centers. To guide the Coordinator and to assure that all tests were developed in accordance with the procedure established by the Staff of the Project, a manual entitled, "Directions for Area Test Coordination, Test Development and Test Administration" was developed. The content dealt with Area Test Center Coordination, Directions to the Area Test Center Administrator, Occupational Cluster Procedures and Analysis. Steps were described in evaluating the written and performance part of a test, test development for the written and performance parts, evaluating the results of performance tests, as well as the procedure for administering the written and performance parts of the tests.

(b) The Role of the Area Test Center Coordinator

The overall responsibility for the development of the written and performance test and the organization of the administration of the tests rested with the Area Test Center Coordinator. The coordinator selected the personnel to prepare the tests, provided directions for the Planning Committee and Test Developing Committee and determined the testing personnel and shop/laboratory testing facilities.

E. Development and Pilot Testing of Written and Performance Tests for Twenty-Four Major Industrial Occupational Areas

Test development and administration and National coordination of Consortium efforts took place concurrently with the efforts to establish a National Occupational Competency Testing Institute for the Consortium of States. The concept of test development and administration on a national scale was tested and involved the following procedures:

1) Development of uniform test development procedures.

2) Occupational job cluster analyses to establish the Scope and occupational content of each examination.

3) Priority determination of the major industrial occupational areas for which tests were to be developed through a survey and analysis of states' needs through consultations with the Planning Committee, Consortium members, Industrial Teacher Education Institutions, Manpower organizations, and the like. Additional considerations centered around student enrollments in specific vocational programs as reported by the states and the U. S. Office of Education and the rate of teacher turnover and replacement.

4) Interested Pilot Area Test Coordinators were designated who had competence in occupational competency test development working with industrial specialists and outstanding individuals in vocational education.

5) Contracts were prepared defining responsibilities for test development and field testing the completed tests in Pilot Area Centers.

6) Pilot Area Test Centers were designated to facilitate accessibility to candidates within states adjacent to the pilot-testing programs.

7) Standards for Pilot Area Testing Centers concerning needed facilities, equipment and machinery were developed from the analysis of the job cluster level of occupational competence.

8) From the same source were derived evaluative criteria for the performance tests and the qualifications, background and level of competence for the performance Examiners.

Subsequent to the testing, scoring and reporting back to participating Consortium members, other national data were secured to establish the reliability and validity of each test, to refine procedures in test development and administration, and to more effectively and efficiently serve the Consortium. These efforts and results are summarized later in this report, followed by recommendations.

Chapter III

OCCUPATIONAL COMPETENCY TEST DEVELOPMENT PROCEDURES

Basic Assumptions

The foundation of effective competency test development rests upon a comprehensive analysis of constellations of occupational job titles grouped into clusters on multilevels of performance difficulties. They range from operatives to highly proficient tradesmen and to technicians in the lower range of professional job classifications. The skills, knowledge and information which constitute occupational competence derived from bona fide work experience in actual paid employment must be identifide by individuals who are able to perform on the various levels of competency according to industrial standards.

A. Advisory and Planning Committees - Composition and Responsibility

1. Composition

To prepare an occupational competency test which effectively evaluates the composite elements of competency for a cluster of jobs on a specific level, it was necessary to bring together an advisory committee. The membership consisted of a group of individuals recognized in the occupational field for the competence, knowledge and understanding of the requirements of the effective range of payroll jobs (which constitute the job cluster).

A representative cross-section for such an advisory committee normally included:

(a) Two representatives from industry with broad competency in their respective occupational areas,

(b) One industrial teacher educator with prerequisite occupational competence, vocational industrial teacher experience under certification, and expertise in test development, and

(c) One to two vocational industrial teachers experienced in the occupational area with leadership potential in test development.

2. Responsibility

The major responsibility of the advisory committee was to assess the guidelines and directions, assist in defining broad coverage of those skills and informational areas which constitute occupational competency, establish levels for which

competency tests were to be developed and recommend guidelines for evaluating test results. The sequence of steps suggested for the Pilot Test Development Advisory Committees are represented geographically in Chart 1.

B. Committee for Test Development

1. Preliminary Preparation

While the Advisory Committee establishes the broad scope of the examination such as competency levels and range, the actual test development must be done by a group of specialists. With the advice and counsel of the Advisory Committee the test development committee identify job titles in an occupational area and cluster the job titles for job groupings from operative to skilled tradesmen to semi-professional technician for each of the tests to be developed. The committees for test development are listed under Appendix E. The procedures used included:

(a) Evaluation of job clusters for completeness,

(b) Determination of the levels of job titles to be included for the examination content,

(c) Development of a master analysis of the various job clusters for competency skills, technology, judgments and other information basic for competency in the occupation,

(d) Formulation from this master analysis of a scope or grid of the examination showing the number of test items for each subarea of the occupation to be included in the examination - written part. An example is included as Appendix H.

(e) Test items (with answers) were formulated, then reviewed and evaluated as to appropriateness, difficulty, clarity of meaning and representativeness to the occupation by the whole committee, and

(f) Format of the Examination - The format was determined by test specialists.

2. General Review of the Examination by the Committee

The committee then reviewed the examination and the answer key for completeness and accuracy.

3. Review by Outside Specialist

The outside specialist(s), from industry, reviewed the examination for content, completeness, appropriateness and level of difficulty.

4. Review of Examination by Professional Testing Organization

In order to achieve an appropriate format, clarity in phrasing the test items and appropriateness of the items, professional testing organizations conducted an objective review and made recommendations. For the pilot tests, the Psychological Corporation of New York City reviewed the machine trades test and the Educational Testing Service, Princeton, New Jersey performed the same service for the electronics test.

C. Performance Test Development

1. The method followed for the written examination was equally applicable to performance test development. However, additional consideration was given by the committee of specialists to such limiting factors as:

   (a) The time required to complete a work sample,

   (b) Machinery, equipment, tools and materials required, and

   (c) Availability of appropriate facilities.

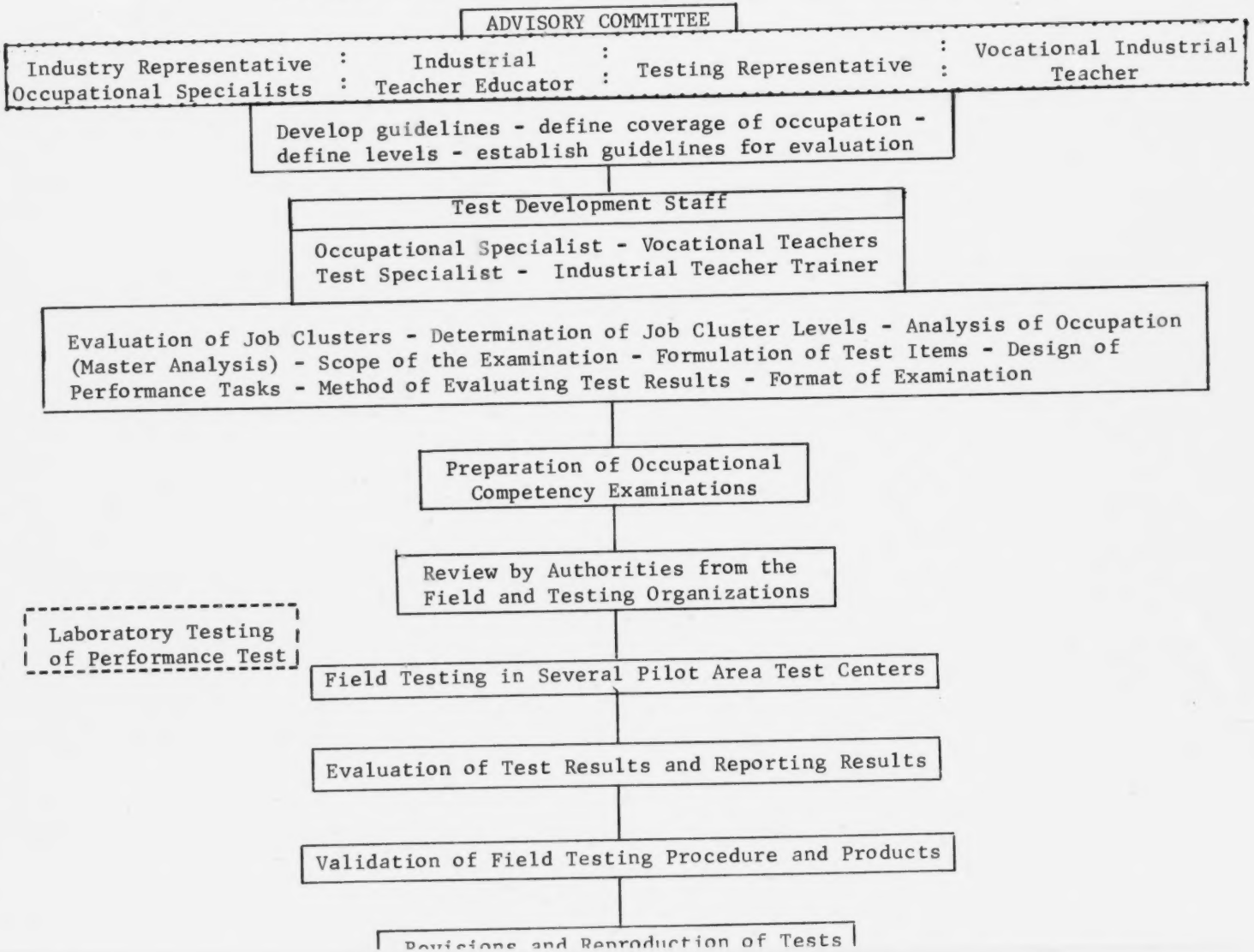
2. A very careful analysis was made to select those skills and work methods most representative of the competency level of the occupation. A "trial test" was conducted to determine whether each performance test was representative of the competency level of the occupation in which candidates would be evaluated.

D. Performance Evaluation of Candidates

Unlike the written part of the occupational competency examination which can be objectively evaluated, the performance test involves personal judgments. In order to reduce the subjectivity of personal judgments and to have each examiner evaluate the same aspects of performance, special evaluation forms were developed. Some required the evaluation of work method and the finished product, others involved diagnosis and corrective procedures during the work performance. Directions for the examiner explaining the use of each form for each occupation were developed. Examples of Performance Evaluation Forms for the two pilot tests appear in the Appendix H.

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

SEQUENCE IN OCCUPATIONAL COMPETENCY TEST DEVELOPMENT


ADVISORY COMMITTEE
Industry Representative
Occupational Specialists
Industrial
Teacher Educator
Testing Representative
Vocational Industrial
Teacher
Develop guidelines - define coverage of occupation - define levels - establish guidelines for evaluation
Test Development Staff
Occupational Specialist - Vocational Teachers
Test Specialist - Industrial Teacher Trainer
Evaluation of Job Clusters - Determination of Job Cluster Levels - Analysis of Occupation (Master Analysis) - Scope of the Examination - Formulation of Test Items - Design of Performance Tasks - Method of Evaluating Test Results - Format of Examination
Preparation of Occupational Competency Examinations
Review by Authorities from the Field and Testing Organizations
Laboratory Testing of Performance Test
Field Testing in Several Pilot Area Test Centers
Evaluation of Test Results and Reporting Results
Validation of Field Testing Procedure and Products
Revisions and Reproduction of Tests

E. Phase I - Occupational Competency Test Development

1. The Planning Committee identified as the two "Pilot" Competency Examinations: the

   (1) Machine Industry Occupations as representing a highly skilled trade and industrial occupational area which requires a high degree of manipulative skill and dexterity; and the

   (2) Electronics industry occupations (communication) requiring a high level of technological competency in comparison to manipulative skills.

   Two related reasons for this decision were: to further experiment with and revise the test construction procedure (if necessary) and to administer the tests under actual conditions in widely-separated geographical locations.

2. Development of Pilot Tests

   The tests for machine trades and electronics communications were prepared by competent subject specialists from industry and highly qualified vocational teachers under the leadership of the Project Staff. The completed tests were then submitted to individuals outstanding in their fields to check completeness of content. Their recommendations and critisisms were incorporated in minor revisions. The tests were then submitted to professional test developing organizations for a final check. The machine trades test was reviewed by the Psychological Corporation and the electronics communication test by the Educational Testing Service.

3. Identification and Location of First Pilot Area Test Centers

   The Project Staff, with the advice of leaders in vocational education from a number of states, obtained the cooperation of four states for pilot testing a number of qualified prospective teachers. Those states — California, New York, Ohio and Tennessee — had considerable experience in administering occupational competency tests in their own states. Each of these states had representatives in the Consortium Committee.

4. Operational Procedures for Pilot Testing

   Each of the four states assigned a state supervisor for trade and industrial education or an industrial teacher educator to provide the direction for the administration of the test, recruit candidates, identify appropriate shop and/or laboratory facilities and, in cooperation with the Project

Staff, selected performance examiners. The following materials were provided:

(a) "Manual for Administering Occupational Competency Tests",

(b) The Scope of the Written and Performance Test for those who were to be tested,

(c) Written tests including special answer sheets,

(d) Directions to the examiner for performance testing (which included a listing of the machines, equipment, tools and materials required) and guidelines for the use of the Performance Evaluation Form and the Performance Evaluation Form,

(e) The performance test for the candidate,

(f) A questionnaire for candidate's reaction to the examination, and

(g) A questionnaire for the examiner's evaluation of the tests.

5. Evaluation of Test Results

The answer sheets for the written examination were computor programmed for scoring, item analysis, establishing reliability, difficulty and discrimination of test items, and other statistical data. The performance parts of the two tests could not be adapted to machine scoring. Because of the difference in the performance requirements between the machine occupations and electronics communications tests, a different evaluation form was used for each test. In both cases, provisions were made for recording the actual observations of the performance by the examiner, as well as an evaluation of the finished product. Provisions were made for a combined rating. In addition, the examiners were requested to make a separate overall statement relating to the observation of overall performance of each candidate.

6. Summary of Pilot Testing Two Occupational Competency Tests

The pilot testing of two occupational competency tests in different industrial areas supported the basic assumptions and procedures established by the National Occupational Competency Testing Project. The pilot test program established:

(a) the feasibility of developing occupational competency examinations in a central location,

(b) contrally developed examinations can be effectively administered in widely separated geographic Test Centers,

(c) administering occupational competency tests on a National scale serves a larger number of states and institutions more efficiently and economically,

(d) test data derived from a National Pilot Testing Program involves a larger number of candidates and, thus, a more valid and comprehensive basis for test evaluation, test improvement and the establishment of standards and norms.

F. Phase II - Occupational Competency Test Development

1. Priority of Occupational Areas

The second phase was connected with the development of written and performance tests in ten additional major industrial areas and pilot testing in ten Pilot Area Test Centers geographically spread over the United States. The priority listing determined by the Planning Committees and the Project Staff follows:

• Automotive Industry Occupations	- Auto Mechanics - Diesel Engine Repair and Maintenance
• Building Industry Occupations	- Carpentry - Masonry - Electrical (Installation)
• Drafting Industry Occupations	- Mechanical Drafting
• Electronics Industry Occupations	- Electronics (Industrial)
• Graphic Arts Industry Occupations	- Printing
• Metal Industry Occupations	- Welding
• Personal Service Industry Occupations	- Cosmetology

2. Identification of Area Test Centers

Through the cooperation of Consortium members, Planning Committee and interested leaders in vocational education, the Project Staff identified qualified individuals to serve as Area Test Coordinators and located appropriate and suitable Area Test Center facilities. Each Test Center agreed to develop one test in a major occupational area and administer the tests developed by other Centers. Contracts were negotiated for the development of the tests. The ten Area Test Centers were located as follows:

California	New Jersey	Tennessee
Colorado	New York	Wisconsin
Georgia	Ohio	

Two Area Test Centers were operated by New York and California.

3. Occupational Competency Testing Schedule

With the completion of the tests for Phase II and the identification of the Area Test Centers, the establishing of a uniform test date schedule represented an extensive cooperative effort on the part of the Project Staff, participating Consortium members, and the Area Test Center Coordinators. A final schedule showing the date of written and performance tests, location of the Area Center, names and addresses of Area Center Test Administrator and the special conditions, if any, under which the candidates might participate and use the test results, were sent to all Consortium members for recruitment of eligible candidates and other assistance to the Pilot Area Test Coordinators. Part of the schedule is illustrated in Appendix H.

4. Evaluation of Test Results

During Phase II the resulting test data from the written tests were tabulated, analyzed and the results reported back to the Area Test Centers. The scoring of the written examination and the calculations for reliability, validity, mean and standard deviation, as well as the making of an item analysis, were computerized for efficiency. For the performance evaluation hand-scoring was necessary. However, several experimental performance evaluation forms demonstrated the feasibility of electronic scoring from data secured through observation and other techniques. A more detailed treatment of the test results of Phase II will be presented in Chapter IV.

5. Summary of Pilot Testing - Phase II

The pilot testing program in ten Area Testing Centers proved practical. Equally practical and efficient results were achieved through computerized evaluation of the test results. This data provided information on the reliability, validity, difficulty of test items and discrimination factors.

The responses from candidates and examiners resulted in suggestions for minor modifications of the written tests.

Aside from time estimates for the performance tests, no modifications were suggested for this part of the examination.

C. Phase III - Occupational Competency Test Development

1. Priority of Occupational Areas

The final group of twelve major occupational areas identified by the Planning Committee, Principal Investigators, and Staff in concurrence with the Consortium Committee included the following:

• Automotive Industry Occupations	- Auto Body Repair - Small Engine Repair
• Aviation Industry Occupations	- Airframe and Power Plant Mechanic
• Building Industry Occupations	- Air Conditioning and Refrigeration - Plumbing - Sheet Metal Fabrication
• Drafting Industry Occupations	- Architectural Drafting
• Electrical Industry Occupations	- Electrician (Industrial)
• Food Industry Occupations	- Quantity Food Preparation
• Wood Industry Occupations	- Cabinet Making and Millwork
• Industrial Technology Occupations	- Civil Technology - Mechanical Technology

2. Identification and Location of Pilot Area Test Centers

The Pilot Area Test Centers in which the remaining group of twelve occupational competency tests were developed and administered were located in the following states:

Connecticut	Kentucky	Oklahoma
Florida	Massachusetts	Vermont
Hawaii	Michigan	West Virginia
Iowa	Montana	Washington

3. Occupational Competency Testing Schedule

The experience gained during Phase I and II of the Project led to a simplification of the schedule procedure. After the schedule of dates and the locations of the testing facilities were identified, the Consortium members were advised to identify eligible candidates and recommend their participation directly to the Area Test Coordinators. A copy of the transmittal memorandum and schedule is included in the Appendix H.

4. Summary of Pilot Testing - Phase III

Phase III reinforced the experience gained in central occupational test development and proved the practicality of a Consortium arrangement beyond any doubt.

It demonstrated greater economy of human and material resources, increased efficiency through National occupational competency testing, and provided valid data for each state to establish its norms and standards.

Most importantly, the pilot testing program during Phase III concluded the twenty-four occupational testing activities for the Project and provided the practical basis for establishing a permanent National Occupational Competency Testing Institute to continue the program and services performed during the Project.

Chapter IV

EVALUATION OF OCCUPATIONAL COMPETENCY TESTS

A. Analysis of Written Test Results From the Administration of Selected Tests

The evaluation of the data derived from the first two occupational competency tests of Phase I is presented in a pattern which is applicable to the remaining twenty-two tests in the total field testing program. The technical aspects of the sample and the characteristics of the test results are treated first, followed by explanations of and the potential use of the type of item analysis that resulted from the study.

1. Technical Aspects

The information presented is based on a pilot administration of two competency tests to two limited sample groups. The written (as opposed to performance) part of the occupational competency examination for Electronic Communication (Form A) consisted of a 130-item four option multiple-choice test. The written part of the occupational competency examination for Machine Trades (Form A) consisted of a 164-item four option multiple-choice test.

2. Estimates of Test Reliability

For each of the tests, reliability was estimated in three ways: the Kuder-Richardson (formula 21), and two split-halves estimates (odd-even and first half vs. second half). In each case the split-halves reliability estimates were corrected for length using the Spearman-Brown prophecy formula.

Table 2 - RELIABILITY ESTIMATES FOR TWO OCCUPATIONAL COMPETENCY TESTS

Occupational Competency Test	KR 21	Split - halves	
		odd-even	1st half - 2nd half
Electronics	.929	.788	.713
		.881*	.832*
Machine Trades	.873	.888	.692
		.940*	.853*
*Corrected with Spearman-Brown			

In Table 2 both sets of test score result in respectable reliability estimates in spite of the limited number of subjects in the pilot groups.

3. Test Score Results

For each of the tests, a mean and standard deviation was computed on the total test, as well as the first half vs. the second half of the test items. The results are presented in Table 3. An examination of these results leads to the conclusion that, in both cases, the first half of the test items tended to be more difficult and produced lower scores than did the latter half. This result appeared less strong in the case of the machine trades test. However, it was noted that some respondents omitted all items past item test No. 150. This occurred through failure of the respondents to record the answers to these items on the back of the answer sheet.

Table 3. TEST MEAN AND STANDARD DEVIATION

Occupational Competency Test	Mean	Standard Deviation
Electronics		
Items 1-65	37.00	10.26
Items 66-130	43.50	10.80
Total	80.50	19.86
Machine Trades		
Items 1-82	52.23	8.44
Items 83-164	54.38	9.66
Total	106.61	16.83

The range of scores on the electronics test was a high of 115 to a low of 52, or 63 score points. These 63 score points represent a range which encompasses 3.16 standard deviations.

They also span approximately ten standard error estimates. The obtained standard error is based on the corrected odd-even reliability estimate used in the following formula:

$$S_e = SD \sqrt{1 - r}$$

Application of this formula yielded a standard error estimate of 6.84 for the electronics test and 4.10 for the machine trades test.

Scores on the machine trades test resulted in a range of 73 to 130 or 57 score points. These 57 score points are the equivalent of 3.37 standard deviations or almost 16 standard error estimates. In either case, it was possible to divide the produced scores in at least five subgroups by total scores, each of which had a reasonable probability of being different from the others.

4. Item Characteristic Summary

The average difficulty index for the electronics test was found to be 61.57 and the average point biserial correlation used as the estimate of the item's discriminating power was .32. For the machine trades test these means were 65.07 and .23, respectively. In addition to the expectation that these estimates of the item strength would increase with larger sampling, the detailed analysis of the items has already produced information which can be used to improve the present forms of these tests.

B. Interpretation of Item Analysis

The item analysis served as the technique to diagnose and evaluate each item in the written test.

1. Sample of Item Analysis

The data in Table 4 was selected from item 45 of the written part of the machine trades test for discussion of the item analysis technique used in the Project.

Table 4 SAMPLE ITEM DISPLAY

Item											
					*						
45	OPTIONS =	1	2	3	4	5	6	7	8	9	OMIT TOTAL
	UPPER	0	0	2	9	0	0	0	0	0	0 11
	LOWER	2	1	6	1	0	0	0	0	0	0 10
	MEAN RIGHT = 119.80				MEAN WRONG = 94.63						VALUE OF T = 5.30
	D50 INDEX = 0.76				D33 INDEX = 0.85						DIFF INDEX = 47.61
	D27 INDEX = 1.00				MISS INDEX = 0.63						PT BIS R = 0.76

By referring to Table 4, the correct answer to Item 45 of the machine trades test is option number 4 (option D on Form A). This option was selected by 9 of the 11 people who constitute the 11 highest scores, but by only one of those who had the ten lowest total scores. For this particular item structure, options 5 through 9 are not available for subject use.

The numbers appearing under options 1, 2 and 3 represent the number of subjects from the upper and lower halves of the distribution of total scores who selected those distractors as the answer to the item. The mean of ALL who selected either 1, 2 or 3 appears as the MEAN WRONG of 94.63; the mean score of those who selected option 4 (the keyed answer) appears as the MEAN RIGHT of 119.80.

The value of T (5.30) is the computed value for a statistical test to ascertain the probability of these two mean scores being statistically different. Given the number of respondents, this difference of 25.17 is statistically significant at the .01 level. This means that a difference in means this large (between mean of rights and wrongs) could have been a chance occurrence less than one time in a hundred.

2. Other Discrimination Indices

In addition to the t test value reported in Table 4 as the value of T, five other methods of estimating item discrimination are implemented in this item display. All of these methods are highly intercorrelated, hence an explanation of one will serve for all.

The most commonly used estimate of item discrimination power appears in Table 4 as PT BIS R = 0.76. The point biserial correlation coefficient of 0.76 is best interpreted by squaring the obtained value and interpreting this computed number as a percent. The square of 0.76 is .5776. Interpreted as a percent, this value is 58%. This indicates the relationship of item number 45 to the total scores produced by this test administration.

PT BIS R values of about .25 and higher are indicative of items which made a consistent contribution to the differentiation of testees on the basis of total score. Items which have negative values for the PT BIS R should be eliminated from the tests.

3. Item Difficulty

The difficulty of an item can be found by consulting the item display under the term DIFF INDEX. In the case of item 45 of the machine trades test, the DIFF INDEX equal to 47.61. This number is the percentage of the sample who answered the item CORRECTLY. Items which have the extreme values for the DIFF INDEX (00.00 and 100.00) can make no differential contribution to the test because the presence, or absence, would have no effect at all on the relative position of produced scores.

4. Alternative Analysis

One of the most interesting aspects of the item display is the response selection itself. Often, a great deal of insight into misconceptions about important concepts can be garnered from this information. In the case of item number 45, it can be seen that the major difficulty of the respondents is with the concept represented by option 3. This type of information can be utilized in planning post-test instruction or in-service education.

5. Test Score Interpretation

The means and standard deviations developed as a result of the pilot administration are presented as another base for score interpretation in terms of z scores. The z score, as the number of standard deviations that a score is above or below a mean, was computed by dividing the difference between a score and a mean by the size of the standard deviation.

$$z = \frac{X - \bar{X}}{S}$$

When applied, using the information from the pilot machine trades test, the data indicated:

$$z = \frac{X - 106.6}{16.8}$$

The values of z under a normal curve as shown in Table 5 would give meaning to the scores when converted into percentiles.

Table 5 z SCORES AND CORRESPONDING PERCENTILES

z Score	Percentile
3.00	99.9
2.00	97.7
1.00	84.1
0.00	50.0
-1.00	15.9
-2.00	2.3
-3.00	.1

C. Supplementary Test Statistics

1. The data derived from the statistical analysis of the written tests of the first pilot series of ten occupations have been compiled in Table 6. This tabulation provides a quick visual view of the test data and included are such items as the total number of test items, maximum and minimum scores achieved by the candidates, the range of scores, Median and Mean Scores, as well as the scores achieved by the upper and lower groups of the test population. The estimated reliability was determined by using the procedure previously described.

2. The item analysis for these pilot tests provided additional information on Item Difficulty Distribution and Item Discrimination Distribution. This information presented in Table 7 provides guidance and direction for test item revision.

D. Limitations of Item Analysis

While item analysis is a powerful tool in test construction, its limitations and shortcomings must be kept in mind. In the absence of external criterion of validity, item analysis operates to make a test more homogeneous rather than more valid. Item analysis can shed little light on the occupational validity or desirability of an item. In the final analysis these factors depend upon subjective evaluation. Therefore, statistical data must be carefully weighed against occupational practice and judgment which is based on broad occupational experience. The data presented in Tables 6 and 7 must be viewed in this perspective.

TABLE 6

STATISTICAL TEST DATA FOR SELECTED WRITTEN TESTS

	NO. TEST ITEMS	MAXIMUM SCORE	MINIMUM SCORE	RANGE	MEAN SCORE	UPPER MEAN	LOWER MEAN	MEDIAN	ESTIMATED RELIABILITY		MEAN ITEM DIFFICULTY	MEAN ITEM DISCRIMINATION	ST. D
AUTO MECHANICS	200	168	71	47	132	152	107	136	.913(1)	.878(2)	.340	.225	18.8
CARPENTRY	159	141	57	84	115	135	93	116	.925	.903	.276	.210	17.6
COSMETOLOGY	120	115	31	84	84	100	75	91	.888	.853	.257	.210	12.2
DIESEL ENGINE REPAIR	167	151	72	79	116	138	89	116	.944	.924	.303	.290	20.7
ELECTRONICS-COMMUNICATION	130	121	34	87	88	112	60	92	.952	.941	.323	.403	20.7
ELECTRONICS-INDUSTRIAL	150	127	56	71	95	121	66	99	.951	.938	.364	.370	23
MACHINE TRADES	164	137	51	86	104	104	80	106	.914	.889	.366	.269	18
MACHINE DRAFTING	138	125	68	57	103	117	85	105	.893	.850	.256	.224	13
PRINTING	130	96	49	47	77	89	60	79	.830	.769	.409	.227	11.5
WELDING	155	130	62	68	48	116	81.6	97	.769	.878	.363	.227	14.5

(1) KUDER-RICHARDSON (20)

(2) KUDER-RICHARDSON (21)

SUMMARY OF DIFFICULTY AND DISCRIMINATION DISTRIBUTION
OF SELECTED WRITTEN TESTS

TABLE 7

		ITEM DIFFICULTY RANGE					ITEM DISCRIMINATION RANGE				
		.81 - 1.00	.61 - .80	.41 - .60	.21 - .40	.00 - .20	.81 - 1.00	.61 - .80	.41 - .60	.21 - .40	.00 - .20
AUTO MECHANIC	No. Test Items	12	21	38	57	72	1	6	28	68	76
	% Test Items	6	10	19	28	36	0	3	14	34	38
CARPENTRY		3	10	27	44	75	0	8	33	49	56
		2	6	17	28	47	0	5	21	31	35
COSMETOLOGY		3	6	15	31	65	0	1	17	34	60
		2	5	13	26	54	0	1	14	28	50
DIESEL ENGINE REPAIR-MAINTENANCE		4	18	26	58	61	2	13	55	30	59
		2	11	16	35	37	1	8	33	18	35
ELECTRONICS - COMMUNICATION		2	9	26	53	40	4	25	36	39	24
		2	7	20	41	31	3	19	28	30	18
ELECTRONICS - INDUSTRIAL		2	15	48	49	36	4	23	43	49	23
		1	10	32	33	24	3	15	29	33	15
MACHINE DRAFTING		5	7	22	36	68	2	12	13	41	61
		4	5	16	26	49	1	9	9	30	44
MACHINE TRADES		5	18	38	55	48	0	5	34	64	50
		3	11	23	34	29	0	3	21	39	30
PRINTING		10	20	33	31	36	1	7	15	48	44
		8	15	25	24	28	1	5	12	37	34
WELDING		5	23	37	40	50	0	7	20	58	51
		3	15	24	26	32	0	5	13	37	33

E. Example of Performance Test Evaluation

The data on the performance section of the first two occupational competency tests in the example being used did not lend itself to as precise and objective an analysis as that of the written tests. However, the subjective judgment of the performance examiner was substantially reduced through evaluation forms on which specific items, rated within a range of points, were observed and recorded. Two aspects of the performance were evaluated: (1) Observed Performance (2) Finished Product. Provisions were made on the forms for a combined rating (see Table 8). In addition, the performance examiner was requested to make an overall statement concerning the performance skill and observation of each examinee. These statements served as a further check against the numerical ratings and the examiner's objectivity. The same comments apply to performance part of the occupational competency tests as shown in Table 8. Each performance must be evaluated according to the special requirements of the occupation.

Table 8 NATURE OF RATINGS ON TWO SAMPLE OCCUPATIONAL COMPETENCY PERFORMANCE TESTS

Candidate	Electronics (Max. Score 100)			Candidate	Machine Trades (Max. Score 115)		
	Observed Performance	Finished Job	Overall		Observed Performance	Finished Job	Overall
a	20	51	71	a	15	17	32
b	22	51	73	b	20	20	40
c	53	23	76	c	25	24	49
d	-	-	81	d	22	28	50
e	58	25	83	e	25	26	51
f	64	23	87	f	27	25	52
g	66	23	89	g	28	30	58
h	65	24	89	h	31	34	65
i	66	29	95	i	34	35	69
j	69	29	98	j	36	36	72
				k	38	38	76
				l	36	45	81
				m	45	37	82
				n	35	48	83
				o	42	42	84
				p	43	42	85
				q	41	46	87
				r	43	46	89
				s	44	49	93
				t	43	51	94
				u	45	50	95
				v	44	53	97

Chapter V

DEVELOPMENT OF THE NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE FOR THE CONSORTIUM OF STATES

A. Establishing a Consortium of States for Occupational Competency Testing

1. Outcomes of the Project

Four significant outcomes of the Project relate to the cooperation and pooling of knowledge and resources for the support of a National Occupational Competency Testing effort through a Consortium of States arrangement.

(a) The states demonstrated their willingness, based on identified needs, to accept occupational competency examinations developed through national effort.

(b) The states have expressed concern for the desirability and the need to form themselves into a Consortium arrangement.

(c) The states agree on the need to pool test result information to provide better foundations for scientifically measuring occupational competence.

(d) The states recognize the tremendous contribution of a national program for measuring occupational competency toward improving the professional stature of vocational industrial/technical teachers who successfully demonstrate their capability to meet high standards of occupational competence as a prerequisite to teaching.

2. Formulation of the Consortium

Concurrent with test development, the efforts of the Project related to the feasibility of establishing a Consortium of States. At the first conference of states' representatives in May 1970, a Consortium of States was organized consisting of the designated representatives of thirty-two states. As the work of the Project progressed, the number of states which designated representatives grew to forty-four. The member states and their representatives are listed in the Appendix A.

3. Major and Ancillary Functions of the Consortium

The Consortium accepted and approved seven directly related major functions and a series of ancillary functions as the basis

for establishing the structure for a functional national organization.

(a) Test Planning and Coordination Functions

(1) Manpower assessment of needs of trade and industrial/technical education teachers to determine occupational competency test requirements in particular occupational fields.

(2) Coordination of a national effort--conservation of human and material resources--determination of Test Centers for certain geographic areas in which to conduct tests and the formation of a cadre of Examiners to administer tests.

(3) Continuous analysis of the state-of-the-art to assure incorporation of the most effective hardware and software into occupational competency testing.

(4) Establish a National Occupational Competency Testing Institute for the planning, development and administration of competency tests and to conduct related studies and services.

(b) Test Development Functions

(1) Conducting in-depth occupational and task analyses as fundamental to test development.

(2) Preparation of occupational competency tests incorporating the most modern information and experience in test development.

(3) Evaluation and refinement of occupational competency tests to meet ever-higher standards.

(4) Optimum test development at minimum cost.

(5) Incorporating computer techniques for statistical analysis of test data.

(6) Establishing a multi-purpose bank of test items for continuous updating of test content.

(c) Test Administration Functions

(1) Setting up a central resource and depository of up-to-date test information and materials.

(2) Establishing central stores for requisitioning tests and test services relative to their administration.

(3) Conducting central scoring of written and performance tests.

(4) Printing and reporting with results immediately available to states for analysis and utilization.

(5) Developing nationally accepted procedures for the accreditation of trade competence toward fulfilling collegiate and certification requirements.

(d) Research Functions

(1) Statistical analysis to establish standards, validity, reliability and relevance to occupational requirements.

(2) Establish close relationships with behavioral, attitudinal, manpower and other research related to occupational competency and its measurement.

(e) Test Reporting Functions

(1) Reporting test results and significant findings cutting across public and private institutions, government agencies, military services and industry.

(f) Fiscal Management Functions

(1) Provide testing programs and services at minimum cost by pooling the collective resources of the states and seeking external funding resources.

(g) Training Functions

(1) Training test personnel and examiners on the accurate interpretation of the test results based on the requirements established by each state.

(h) Ancillary and Related Services

(1) Correlating services and activities related to vocational, industrial/technical education programs dealing with evaluating the occupational competency of students and others.

(2) Explore possible coordination with the military in testing individuals with occupational competence toward advanced standing in military establishments.

(3) Coordination with labor and industry relative to methods and procedures of appraising occupational competency.

4. Framework for Membership

(a) Basic Understanding

As a basic understanding to the establishment of the National Consortium of States for purposes to be served by the National Occupational Testing Program:

(1) Each interested state was requested to designate an experienced, knowledgeable representative responsible for coordinating competency activities in his state with the National Testing Service.

(2) The state agreed to participate and to pay expenses of its representative to an annual meeting of the Consortium. The Consortium members were to establish the conditions of responsibility for membership.

(b) Other understandings related to:

(1) Agreement to use the tests and services of the N.O.C.T. Institute as the only competency tests (as they were developed).

(2) Utilizing the services of the National Occupational Competency Testing Institute, through payment for examinations determined by the state, at minimum cost as established by the Administrative Board of the Consortium.

(3) Agreement to use the occupational competency tests solely for the purpose intended.

(4) Agreement not to duplicate the occupational Competency tests for any other purpose.

(5) Maintaining the security of occupational competency tests.

(6) Cooperation in returning all tests and test data necessary for research and further occupational competency test development.

(7) Support Consortium efforts to secure external funds as approved by the Administrative Board.

(8) Agreement by the states to coordinate their occupational competency testing efforts with those of the Consortium, to share knowledge and experience.

(9) Agreement to abide by the Consortium Board's decisions insofar as they did not conflict with established state policy.

5. Suggested Organizational Structure for the Consortium of States

A preliminary organizational structure for the Consortium included a Consortium of States; an Administrative Board with one representative elected from each region, and an Executive Council elected from the Administrative Board. The Council officers included a chairman, vice chairman and secretary/treasurer. A slightly modified model of the original structure was subsequently approved and a National Occupational Competency Testing Institute for Vocational Industrial/Technical Education, incorporated. Its administrative structure is presented in graphic form in Chart 9.

B. Organizing the National Occupational Competency Testing Institute

1. Estimated Testing Services Needed Annually

For purposes of establishing a workable basis for a National Institute of Occupational Competency Testing, the Project Staff conducted a "Market Survey" in terms of the nature and number of tests required annually. Accurate information was difficult to obtain because of such factors as the development of new vocational programs, fluctuation in demands of the labor market, changing federal support for vocational education, and others. The results of the survey are summarized in Table 10 which shows estimated replacement requirements as reported by the states to the U. S. Office of Education. Interestingly, these tabulations coincide closely with the programs of largest student enrollment and the largest number of teachers employed.

2. A further tabulation was made of the teachers employed by the states as reported to the U. S. Office of Education. The replacements shown in Table 11 were computed from the data in Table 10 which reported the number of teachers employed full time in Secondary, Post-Secondary and Adult Education programs. Replacements were calculated on a turnover rate of 5% for the first two categories and 10% for the third. "Part-time" teachers were not included.

Table 9 SUGGESTED STRUCTURE FOR THE CONSORTIUM TO MANAGE AND ADMINISTER THE NATIONAL OCCUPATIONAL COMPETENCY TESTING PROGRAM

CONSORTIUM OF STATES FOR NATIONAL OCCUPATIONAL COMPETENCY TESTING (Trades, Industries, Industrial Services and Industrial Technical Occupations)
All states represented to plan services, advise on overall direction, and recommend policies and procedures. Includes a representative of NASDVE and ex-officio members of the Executive Council to December 31, 1974

ADMINISTRATIVE BOARD ** (Establishes policies, serves approval functions, provides administrative direction)										
I	II	III	IV	V	VI	VII	VIII	IX	X	One member elected from each region
Ex-Officio: Representative of NASDVE and ** Principal Investigators, Project Staff, Contract Organization Representative and U.S.O.E. Project Officer (** To serve until December 31, 1974)										

EXECUTIVE COUNCIL ** RELATES TO MANAGEMENT AND ADMINISTRATION FUNCTIONS (Policies, Controls, Budget, Accountability)		
Chairman	Vice Chairman	Secretary/Treasurer
Elected from the Administrative Board		
Ex-Officio: Representative of NASDVE and ** Principal Investigators, Project Staff, Contract Organization Representative and U.S.O.E. Project Officer (** To serve until December 31, 1974)		

THE NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE FOR VOCATIONAL INDUSTRIAL/TECHNICAL EDUCATION
BOARD OF TRUSTEES AND PROGRAM DIRECTOR

Table 10. NUMBER OF TEACHERS EMPLOYED "FULL TIME" BY REGIONS AND REPLACEMENT NEEDS*

Region	Number of Secondary School Teachers	Replacement	Number of Post-Secondary School Teachers	Replacement	Number of Teachers in Adult Program	Replacement
I	2,154	109	483	26	1,845	185
II	4,150	208	2,513	126	2,316	231
III	3,195	161	1,033	52	2,807	280
IV	4,135	307	5,087	254	7,375	737
V	5,696	285	5,118	261	7,714	771
VI	2,178	118	1,637	81	2,033	202
VII	785	39	797	40	1,557	155
VIII	255	12	793	40	696	70
IX	1,279	64	3,012	150	163	16
X	238	12	670	34	7	1
Total	24,065	1,215	21,253	1,064	26,513	2,648

NUMBER OF TEACHERS EMPLOYED "PART TIME" BY REGIONS AND REPLACEMENT NEEDS**

VIII	427	43	305	31		
IX	1,098	110	3,012	301	679	31
X	135	10	872	40	3,490	300
Total	1,660	163	4,189	372	4,169	331

* Derived from State Reports to Regional Offices of the U. S. Office of Education
** Not included in replacement estimates for the N.O.C.T.P.

Table 11 ESTIMATED REPLACEMENT REQUIREMENTS BY OCCUPATIONS*

		Estimated Replacement
Aircraft Industry Occupations	- Airframe and Power Plant Mechanic	75
Automotive Industry Occupations	- Auto Mechanic	300
	- Auto Body Repair	115
	- Diesel Engine Maintenance	50
	- Small Engine Repair	60
Building Industry Occupations	- Air Conditioning and Refrigeration	100
	- Carpentry	110
	- Masonry	40
	- Plumbing	50
	- Sheet Metal	65
	- Electrical Installation	75
Drafting Industry Occupations	- Architectural Drafting	125
	- Machine Drafting	80
Electrical Industry Occupations	- Electrician, Industrial	75
Electronics Industry Occupations	- Electronics, Communication	75
	- Electronics, Industrial	75
Food Industry Occupations	- Quantity Food Preparation	75
Graphic Industry Occupations	- Printing	60
Machine Industry Occupations	- Machine Trades	150
Metal Industry Occupations	- Welding	85
Personal Service Industry Occupations	- Cosmetology	100
Industrial Technical Occupations	- Civil Technology	50
	- Mechanical Technology	50
Wood Industry Occupations	- Cabinet Making and Millwork	80
	Total	2120

* As reported by Vocational Education Divisions of the States to the Project for 1972.

3. Other Factors Affecting Test Number Estimates

(a) To the number derived from the tabulation must be added estimated drop-out rate of 15% among the individuals who are attending Industrial Teacher Education programs preparatory to entering teaching.

(b) Another potential source of candidates which adds to estimated needs for additional tests, are teachers in service in states which require proof of occupational competency for certification. However, since no statistical data as to the number of states and individuals involved was available, this requirement must be considered as a future potential.

(c) Another potentially promising application of occupational competency tests is in the area of undergraduate and graduate degree programs. With salary schedules increasingly based on college credit, there has been a substantial growth in collegiate degree programs in vocational education. Many institutions offering such programs are granting advanced credit for occupational competency. They are searching for objective measures to evaluate such competency.

(d) A final promising area of application of competency tests is with the graduates of preparatory and extension, full-time and part-time vocational programs. From the occupational analyses and test item bank established for each major occupational area, with modifications, special tests can be developed to meet other specific training measurement needs.

4. Total Estimate of Tests Needed Annually

From the sources reviewed and allowing for undetermined variables, a conservative estimate would indicate that there is need annually for 2500 written and performance competency tests.

5. Consortium Member Support of Continuing Program and Services

Based on estimated needs and prorating costs on a demand basis, all Consortium members were advised as to their share of the cost of operating a permanent Institute and the services available in return for their financial operating share. The following states responded with a Memorandum of Intent to

financially support a permanent program according to the guidelines previously described.

Alaska	Indiana	Oklahoma
Arkansas	Iowa	Oregon
Colorado	Kentucky	Rhode Island
Delaware	Maine	Utah
District of Columbia	Massachusetts	Vermont
Florida	Montana	Virgin Islands
Georgia	Nebraska	Virginia
Idaho	New Jersey	Washington
	Ohio	Wisconsin

Additional states indicated their intention to participate but were unable to clear such a Memorandum in the suggested time limit.

6. Identification of a Contract Organization

- Exploratory meetings were held with the representatives of interested organizations, the staff and Principal Investigators to establish the conditions under which the Project might be moved, at its termination, to a more permanent base. Possible demand and other organizational conditions were identified in a request for "Proposal for Organizing and Operating a National Occupational Competency Testing Center". Such a Center would function under the administrative direction of the National Occupational Competency Testing Institute of the Consortium.

- This request for proposal was distributed to a number of interested State Directors of Vocational Education, Consortium Representatives, and such organizations as the following:

  - Educational Testing Service, Princeton, New Jersey
  - Psychological Corporation, New York, New York
  - Science Research Associates
  - The Center for Vocational and Technical Education, Columbus, Ohio
  - Ohio State Department of Education, Instructional Materials Laboratory, Columbus, Ohio
  - Dunwoody Industrial Institute, Minneapolis, Minnesota
  - Eastern Michigan University, Ypsilanti, Michigan
  - Delmar Publishers, Albany, New York

- There were 20 respondents, eight of whom expressed continuing interest. Five organizations finally submitted proposals. Using criteria which were described earlier, each proposal was evaluated by the Executive Council who made recommendations to the Administrative Board. By action of this latter group, the Project Staff was authorized to negotiate an agreement with Educational Testing Service to contract with that organization to perform all developmental and test administrative functions which had been carried on during Phases I, II and III of the Project. The Agreement, signed by two Institute Officers, provides for a continuation of the N.O.C.T. Program and services without interruption, effective July 1, 1973.

Chapter VI

PUBLIC INFORMATION AND DISSEMINATION ACTIVITIES

A. National Project Visibility

1. National visibility was provided through articles in the American Vocational Journal

2. Additional information concerning the recognition of occupational competency was published in "School Shop", a national journal relating principally to industrial education and vocational education.

3. Two descriptive brochures concerning Phase I and Phases II and III of the Project were widely distributed among State Directors of Vocational Education, State Supervisors of Trade and Industrial Education, Industrial Teacher Educators, Teacher Organizations, and others concerned with test development and administration.

B. Presentations to Selected Professional Organizations (Partial List)

- Address - National Association of State Directors A.V.A. Convention, December 1969, Boston
- Progress Report - National Association of State Directors A.V.A. Convention, 1970, New Orleans
- Technical Presentation - Research Committee of Trade and Industrial/Technical Teacher Educators, A.V.A. Convention, 1970, New Orleans
- Address - National Association of State Supervisors, 1971, St. Louis
- Address and Workshop, A.V.A. National Industrial Education Conference, October 1971, Arlington
- Address - National Association of State Supervisors of Trade and Industrial Education, A.V.A. Convention, December 1971, Portland
- Address - Research Session of National Association of Industrial Teacher Educators, A.V.A. Convention, December 1971, Portland
- Presentation - Policy and Planning Committee, Trade and Industrial Education Division, A.V.A. Convention, 1971, St. Louis
- Address - American Federation of Teachers, Local No. 2 Convention, May 1972, New York

- Progress Report - National Association of State Directors, September 1972, Columbus

- Workshop - Division of Industrial Teacher Education, Wayne State University, October 1972, Detroit

- Workshop - Division of Continuing Education, New York State Education Department, Syracuse University, Syracuse, January 1973

C. Other Dissemination Activities

A continuous effort was maintained to keep State Directors of Vocational Education, State Supervisors of Trade and Industrial Education, Industrial Teacher Educators, Consortium Representatives, and Area Test Coordinators informed through copies of presentations, progress reports and other planning materials. The following is a partial listing:

- "The State-of-the-Art of Occupational Competency Testing"

- Progress Report to the National Association of State Directors of Vocational Education

- "The Need for Occupational Competency Testing" U.S.O.E. Report, December 1, 1971

- "Occupational Competency Testing - A National Necessity", U.S.O.E. Report, December 1, 1971

- "Occupational Competency Tests for Future Vocational Teachers", U.S.O.E. Report, December 1, 1971

- Field Testing of Ten Occupational Competency Tests

- Schedule of Ten Occupational Competency Tests, U.S.O.E. Report, January 1, 1972

- Progress Report on Phase I, 1972

- "Functions of the National Occupational Competency Testing Service for Vocational Industrial Technical Education"

- "Framework for Membership in the Consortium of States"

- Progress Report on Phases II and III to State Directors of Vocational Education; Head, Industrial Teacher Educators; Head, Supervisors of Trade and Technical Education; Consortium Representatives

D. Study of Current Practices Within States in Recognizing Occupational Competence

As the Project moved from the developmental to the operational phase, increasing recognition developed among the states as to the extent and nature of the service which was provided by the Project and the greater economy, as well as higher educational productivity through Consortium effort. A substudy was made of present practices of recognizing occupational competency involving 250 Industrial Teacher Education Programs. The results were distributed among the Consortium states, with an abstracted summary appearing in the American Vocational Journal.

E. Feed-Back on Test Results

The test results for all tests were tabulated and made available to each state participating in the Pilot Testing Program through a

- Score Range for each test administered in each Pilot Area Test Center, and
- Score range for the total national testing program, including standard deviation and percentile ratings.

Each state was thus able to evaluate test results in terms of its own needs and, at the same time, conduct comparisons with the national test results.

F. Orientation and Field Service

At all times during the Project, a close relationship was maintained through orientation and field services. Consortium member states were kept informed by means of periodic progress reports. Especially significant were the on-site conferences conducted with Pilot Area Coordinators, Test Developers and Examiners in the following states:

California	Illinois	New York
District of Columbia	Iowa	Oklahoma
Florida	Montana	Washington
Georgia	New Jersey	West Virginia
		Wisconsin

Chapter VII

CONCLUSIONS AND RECOMMENDATIONS

A. State-of-the-Art

The State-of-the-Art proved, unequivocally, the need for a national effort to coordinate human resources, physical plant for test planning, development, administration and evaluation and the pooling of financial resources.

It focused, through analysis, attention upon the limitations of content, validity and reliability of tests developed under limitations of resources and personnel.

It established clearly the duplication of effort and the existence of severe restrictions on the capabilities and/or ability of any state, even the most highly industrialized and most densely populated states, or private organization, to produce quality examinations needed for the basic industrial occupations.

Recommendations

To maintain test quality and keep the test content in the major occupational areas current, continuing effort is essential for the identification of new developments in each occupational area which influence the occupational competence requirements. Provisions must be made for the inclusion of such an evaluation effort on a continuing basis. Adequate provisions are needed for the financing and staffing of such effort.

B. Test Development Procedure

The Project has established a practical procedure for effective test development, based on the comprehensive analysis of occupational constellations of job titles, grouped into Job Clusters on multi-levels of competency, for the development of comprehensive occupational competency examinations.

Recommendations

Although a breakthrough was achieved in greater objectivity for performance evaluation; additional efforts are needed for the determination of norms and standards on a national scale and in inter-examiner reliability.

The nucleus of twenty-four tests must be expanded to cover the whole spectrum of trade and industrial/technical education. It is strongly recommended that the Test Development Program be expended, through National effort, to cover all occupational areas in trade and industrial/technical education. Further, that similar testing service in other vocational fields be explored.

C. Test Methods and Aids

The Project produced aids and reference materials for the development of occupational competency tests; especially, performance tests that were not available before, through the "Handbook for Developing and Administering Occupational Competency Tests". Procedures were established for area test coordination with the publication of "Directions For: Area Test Center Coordination, Test Development, Test Administration".

Recommendations

The National Occupational Competency Testing Institute will function with a cadre of test developers who are familiar with the test methods and aids. However, supplementation is needed to expand the number of competent test developers through conferences and workshops.

D. Occupational Competency Testing on a National Scale in Area Test Centers

The feasibility of test development through a National Institute and Area Centers was clearly proven by the development of written and performance tests in twenty-four major industrial areas. Each test consisted of two forms; therefore, (in fact) forty-eight tests were developed. Twenty-four of the industrial occupational areas were pilot tested in as many Area Testing Centers.

Recommendations

The existing network of Area Centers must be expanded to assure service to all states and provide easy access for all candidates interested in participating in the Occupational Competency Testing Program.

E. Consortium of States

The viability of a National Occupational Testing Program has been established through the cooperative efforts of the states. A Consortium organization for Occupational Competency has been established and a measure of financial commitment achieved which will assure the continuation of the program and services which had been provided by the Project.

F. The National Occupational Competency Testing Institute and Continuing Project Program and Services

A Constitution, By-Laws and Operating Policies were prepared for establishing a permanent National Occupational Competency Testing

Institute of the Consortium. These documents, reported earlier as having been approved by the Administrative Board, are subject to ratification at the annual meeting of the Consortium in December 1974. The National Occupational Competency Testing Institute was incorporated under laws of the State of New Jersey on May 24, 1973.

Contractual arrangements have been concluded with the Educational Testing Service. The Agreement with ETS relates to the reproduction, distribution, scoring and reporting of test results and the evaluation of the instruments produced by the National Occupational Competency Testing Project. Provision has been made to extend test development into new major industrial occupational areas in accordance with needs and under conditions identified by Consortium.

APPENDICES OF SELECTED RESOURCE MATERIALS

A. Invitation to Consider N.O.C.T. Consortium Organization

B. Defined Functions and Framework for Membership

C. State-of-the-Art Literature/Experience Search

D. Phases II and III Groundwork for Consortium Organization

E. Test Development and Administration

F. Support for N.O.C.T. Program

G. Proposals for Project Continuation

H. Field Testing Occupational Competency Tests

I. Establishment of Permanent N.O.C.T. Institute

APPENDIX A

INVITATION FOR STATE REPRESENTATIVE PARTICIPATION

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

Plaza Seven Office Building 1202 Route 7
Latham, N. Y. 12110 Phone (518) 785-1524

DR. C. THOMAS OLIVO
Director

DR. ADOLPH PANITZ
Associate Director

February 13, 1970

TO: State Directors of Vocational Education

SUBJECT: Occupational Competency of Teachers

Many State Directors have, over a number of years, expressed a need to more effectively and efficiently measure the occupational competencies of their vocational industrial/technical education teachers. For, the quality of the instructional program and the employment of the graduates depend upon the work skills developed within industry, and the knowledge of the potential teacher of essential related content and accompanying technology.

Last year you were advised of the National Occupational Competency Testing Project. The attached brochure will refresh you on Phase I. In a cooperative Consortium it is envisioned that each State will have flexibility to establish its own conditions for administering its program.

At this time the principal investigators would like to give a progress report to the State Directors and to explore the feasibility of forming a Consortium of States. A few alternative plans have been developed for consideration. The services that may be performed, cooperative understandings among the States, administration of a possible Consortium undertaking, are some of the items that need to be reviewed. If there are any other specific issues that you feel should be presented, these will be welcomed. After all, the whole purpose is to serve the States.

You are invited to either attend personally or to send a person from your state who is or will be responsible for administering the industrial teacher training program for your state and/or the trade proficiency testing program. The seminar will be held in Chicago* beginning promptly at 1:00 p.m. on March 13 and continuing until March 14 noon. The attached tentative schedule identifies the three sessions. Conferees are expected to attend and participate in each session and remain until adjournment on March 14.

Your travel and subsistence expenses (or the person whom you designate) will be paid from the project under conditions that apply to the USOE. Will you advise by February 27, using the self-addressed card? We appreciate your continuing concern and feel we can have a breakthrough if this is the will of the conferees.

Cordially,

C. Thomas Olivo

C. Thomas Olivo

Principal Investigators

DR. CARL SCHAEFER
Rutgers University, New Jersey

DR. MELVIN BARLOW
University of California, Los Angeles

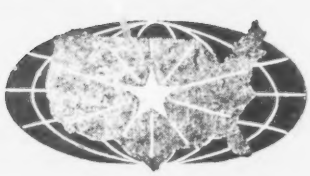
DR. RICHARD NELSON
State Dept. of Education, California

"Consortium for Occupational Competency Testing of Trade and Industrial/Technical Teachers — Phase 1." Research Project Grant 8-0474, Bureau of Research, United States Office of Education to the Graduate School of Education, Rutgers University.

• INFORMATIONAL BROCHURE ON PHASE I

OCCUPATIONAL COMPETENCY TESTING

TRADE AND
INDUSTRIAL/TECHNICAL
EDUCATION TEACHERS



A CONSORTIUM OF STATES PROJECT

PHASE-1

- ORGANIZATION
- PLANNING
- PRE-TESTING

THE NEED FOR A NATIONAL OCCUPATIONAL COMPETENCY TESTING PROGRAM

The tremendous expansion of vocational industrial/technical education programs requires the selection and development of great numbers of teachers with demonstrated occupational competence. Objective measures are urgently needed to determine that a prospective teacher has the prerequisite occupational skill and knowledge for teaching.

An earlier seminar at Rutgers University on the feasibility of providing occupational competency examinations on a national basis (with 23 states participating) established these facts:

- Many states need help with the preparation and administration of a teacher testing program.
- A national effort would reduce or eliminate much duplication now found in a number of states.
- Substantial economies would be achieved.
- National effort would provide flexibility with all states having access to the examinations, yet each state would retain wide latitude in the use and interpretation of the results.
- A National Testing Program would have a wholesome effect upon the vocational teaching profession, similar to architecture, accounting, etc.
- States are concerned about the reliability of occupational tests and their limited resources to establish reliability.

THE CONSORTIUM CONCEPT

It is reasonable to assume that a number of states, acting together, can develop a National Occupational Competency Testing Program.

A Consortium of States is considered a possibility for establishing effectively and efficiently the broadest possible base for such a program.

Among other major functions, the Consortium may provide an administrative vehicle, develop administrative policies, establish guide lines, set essential controls, and lay out plans for implementation.

PROJECT GOALS

PHASE I

- To organize a Consortium of States.
- To survey the "state of the art" of occupational competency testing.
- To prepare a handbook as a guide to the development of occupational competency tests for qualifying prospective vocational teachers.
- To conduct a comprehensive analyses of one major industry constellation, and one technical occupational constellation.
- To develop two pilot competency tests (one written—one practical) for each of the two major occupations

PHASE II

- To develop proficiency tests in other selected trades and/or industrial technical occupations.
- To establish reliability and validity of the tests.
- To develop uniform scoring techniques.
- To prepare interpretive materials and establish norms, standards, etc.
- To set up guide lines for using the tests.

PHASE III

- To devise effective procedures for administering occupational competency tests throughout the nation.
- To establish examination centers at appropriate locations.
- To put into operation a feasible program of occupational competency testing under a Consortium of States arrangement.

• INFORMATIONAL BROCHURE ON PHASE I

PROJECT GOALS

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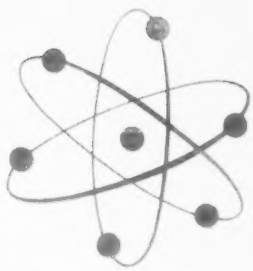
- To establish examination centers at appropriate locations.
- To put into operation a feasible program of occupational competency testing under a Consortium of States arrangement.

PROCEDURES TO ACHIEVE GOALS

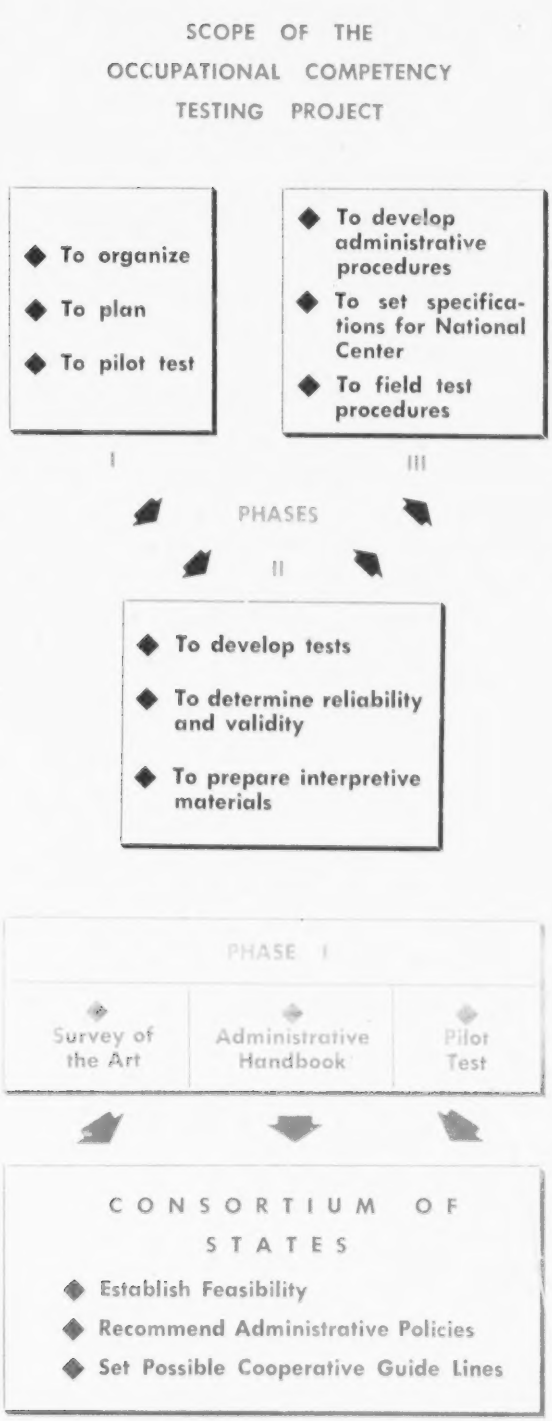


A review of the "state of the art" is the first item of concern. The literature on occupational competency testing is sparse. Yet, it is known that various states, industries, government agencies, et al have done work in this area.

The project is charged with the responsibility to:

- Request, collect, collate and summarize relevant Information.
- Conduct field visits and observe existing practices and procedures first hand.
- Make occupational analyses of two major occupational constellations.
- Establish specifications and contractual relations for developing two pilot tests.
- Set up a pool of test materials for specific tests.
- Conduct field trials for tests that are developed.
- Carry on statistical analyses; determine norms and standards.
- Prepare and publish administrative guide lines for each occupational proficiency examination.
- Explore administrative a national competency testing program under a Consortium of States arrangement.
- Establish pilot conditions to test all procedures.

- INFORMATIONAL BROCHURE ON PHASE I



• RATIONALE AND PLAN FOR NATIONAL EFFORT

I. THE PROBLEM

Among vocational administrators and industrial teacher educators there is increasing concern for a reliable measure to evaluate the occupational competency of prospective trade and industrial and technical teachers.

A number of states - notably New York - California - Pennsylvania and Florida - require successful passing of competency examinations as a requirement for certification. Other states have started or are planning to start using examinations.

Many state officials have stated frankly that their departments are not equipped to develop new examinations or keep old ones up to date. There is general agreement that the developing, printing, distribution, administration, scoring, and validation impose a heavy burden on limited resources.

II. THERE IS A NEED FOR MORE RELIABLE INSTRUMENTS

Most examinations are of the paper and pencil variety, although some require actual performance in simulated job situations. They have been constructed by vocational industrial educators and skilled craftsmen in industry. There is little evidence that those instruments have been validated according to accepted test development procedures. Limited attention has been devoted to such important technical consideration as reliability of scores or objectivity and dependability of controlled scoring procedures.

III. A NATIONAL EFFORT IS NEEDED

A seminar at Rutgers University held September 26, 1966, with twenty-three states taking part on the "Feasibility of Providing Occupational Competency Examinations on a National Basis" agreed that:

1. Many states need help with the preparation and administration of a test program.

2. A national effort would reduce or eliminate much of the duplication now found in a number of states.

3. Substantial economies would be achieved.

4. National effort would provide flexibility. All states would have access to the examinations, yet each state would retain wide latitude in the use and interpretation of the results.

5. A national testing program would have a wholesome effect upon the vocational teaching profession similar to architecture, accounting, etc.

6. More valid evaluations of examinations should result in a testing program having greater reliability and validity.

IV. THE PLAN CALLS FOR THREE STAGES OF DEVELOPMENT

The Project will be carried out in three phases. Phase I will be organizational, exploratory and preparatory. In essence, Phase I will "build on" the original Rutgers Seminar and capitalize on the twenty-three states participation already started. Phase II will involve actual test development and the preparation of interpretive materials. Phase III will be concerned with the inauguration of testing programs that may be used throughout the nation.

A. Objectives of Phase I (presently under way)

1. To organize a consortium of states. A representative steering committee has already been elected and has established guiding principles for the Project. Later in the year a plan will be advanced for organizing a consortium of interested states and laying the groundwork for an administrative body.

2. To survey the "state-of-the-art" of occupational competency testing wherever it is carried on.

3. To prepare a handbook which will serve as a guide with development of occupational competency tests for identifying prospective vocational industrial/technical teachers.

4. To conduct a comprehensive analysis of one major trade industries occupation and one technical industries occupation for which tests are to be developed.

B. Administration

1. All activities for Phase I will be carried on under the title NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT.

2. The Project grant has been awarded to Rutgers University. The principal investigators are: Dr. Carl Schaefer, Dr. Melvin Barlow, Dr. Richard Nelson and Dr. C. Thomas Olivo. The latter is serving as project director with Dr. Adolf Panitz as associate director.

3. Facilities and offices in Latham, New York are being provided by State University College, Oswego, Department of Vocational Technical Education.

C. Procedure

The review of the "state-of-the-art" is the first item of concern. A search of published literature reveals only fragmentary reports about the use of performance tests, simulation techniques and written tests intended to measure occupational competence. Yet, it is known that work has been done in this area by the various states, by industry, by governmental agencies, by contract research groups. Unfortunately, most of the research is not generally accessible. Even more elusive are practices that have evolved over many years but have never been described in full detail. It is essential, therefore, for the research team to:

1. Request - collect - collate and summarize in usuable fashion as much relevant testing information as possible.

2. Conduct field visits and observation of existing practices and procedures.

3. Establish occupational specifications for which tests will be developed.

4. Set up a pool of test materials for specific tests.

5. Make analyses and contract for the preparation of two major competency tests. Test the materials for reliability and validity.

• PARTICIPANTS AT INITIAL SEMINAR IN CHICAGO

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

STATE	
ARIZONA	John W. Glenn, Coordinator for Vocational-Technical Education, 1626 West Washington, Phoenix, Arizona 85007 Phone: 271-5564
CALIFORNIA	Richard Nelson and Melvin Barlow Principal Investigators
COLORADO	James A. Wilson, Assistant Director Occupational Division State Board 1525 Sherman Street, Denver, Colorado 80203
CONNECTICUT	Frederick S. Okula, Consultant, Trade and Industry P. O. Box 2219, Hartford, Connecticut
DELAWARE	Donald E. Dunkel, State Supervisor P. O. Box 697, Dover, Delaware 19901
DISTRICT OF COLUMBIA	Frank B. Lawrence, Acting Assistant Superintendent Vocational Education, District of Columbia Public Schools, 415 - 12th Street, N. W. Washington, D. C. 20004
HAWAII	Samson S. Shigetomi, State Director Vocational Education, 2327 Dole Street, Honolulu, Hawaii 96822
ILLINOIS	Clem Bogard, Consultant 160 North LaSalle, Chicago, Illinois
INDIANA	Monte Janick, Supervisor of Industrial Education State House, Room 401, Indianapolis, Indiana 46204 Phone: (317) 633-4845
IOWA	Howard R. Hammond, Consultant (Teacher Education-Vocational) Department of Public Instruction Grimes Office Building, Des Moines, Iowa 50319
KANSAS	Don Wohman, Teacher Educator Kansas State College of Pittsburg Pittsburg, Kansas 66762
KENTUCKY	D. K. Stewart, Embassy Drive, Lexington, Kentucky
MAINE	John S. Greer, Professor Industrial/Technical Education, Gorham State College Gorham, Maine 04038

MARYLAND	Kenneth Skaggs, Assistant Professor University of Maryland, College Park, Maryland 20742
MICHIGAN	Raymond LaScotte Eastern Michigan University, Ypsilanti, Michigan
MINNESOTA	Bud Jagusch 525 South Brick Street, Stillwater, Minnesota 55082
MISSISSIPPI	Joe McDaniel, Supervisor, Vocational Guidance Jackson, Mississippi 39205 Phone: 354-6850
NEBRASKA	Floyd Koubick, Dean School of Business and Technology Kearney State College, Kearney, Nebraska 68847 Phone: (308) 237-5961 Ext. 310
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NEW HAMPSHIRE	Walter E. Minet, Trade and Industry Education P. O. Box 771, Concord, New Hampshire 03301
NEW JERSEY	George Russ, Director Vocational Technical Education and Leadership Development, State Education Department 225 State Street, Trenton, New Jersey
NEW YORK	Gordon McMahon, Director, Division of Vocational Technical Education, State University college at Oswego, New York
NORTH CAROLINA	Charles D. Bates, Coordinator, Preparatory Occupational Programs, Department of Public Instruction, Raleigh, North Carolina 27602
OHIO	Harry F. Davis, Assistant Director, Vocational Education, State Department Building, Room 610, 65 South Front Street, Columbus, Ohio 43215
OREGON	Donald M. Gilles, Coordinator, Program Development and Evaluation, Oregon Board of Education, 942 Lancaster Drive, NE, Salem, Oregon 97310
PUERTO RICO	Gladys Abad de Sánchez, Vocational Guidance Director, Department of Education, Hato Rey, Puerto Rico
RHODE ISLAND	Edward I. Medeiros, Chief, Vocational Education Roger Williams Building, Hayes Street, Providence, Rhode Island 02908
SOUTH CAROLINA	Francis A. Rosdell, Assistant Teacher Educator Trade and Industry Education Department Clemson University, Clemson, South Carolina 29631

SOUTH DAKOTA	Thomas C. Stone, Chairman, Division Vocational and Technical Education, Southern State College Springfield, South Dakota 27062 Phone: (605) 364-2991
TENNESSEE	Joe L. Reed, University of Tennessee Donald D. Riggs, Assistant Professor Industrial Education Department University of Tennessee, Knoxville, Tennessee Phone: 584-7976
TEXAS	B. M. Hackney, Head, Vocational Industrial Teacher Education, Texas A & M University, College Station, Texas 77843
UTAH	Jay I. Campbell, Deputy Superintendent 1400 University Club Building, 136 East South Temple Salt Lake City, Utah 84111
VERMONT	Joseph P. Kisko, Teacher Educator, Division Vocational-Technical Education, State Office Building, Montpelier, Vermont 05602
VIRGINIA	Lester G. Duenk, Assistant Professor, Industrial Education, Virginia Polytech Institute, Blacksburg, Virginia 24601
WEST VIRGINIA	J. Jackson Townsend, State Supervisor Capitol Building, Charleston, West Virginia 25305 Phone: 925-7846
WISCONSIN	George R. Kinsler, Chief, Trade and Industry Education Wisconsin Board of Vocational-Technical and Adult Education, 137 East Wilson Street, Madison, Wisconsin 53703
WYOMING	Oscar Unruh, Auto Mechanic Instructor Laramie High School, Laramie, Wyoming 82070 Phone: 745-7391

Principal Investigator	-	Dr. Carl J. Schaefer
Project Director and Principal Investigator	-	Dr. C. Thomas Olivo, Professor Department of Industrial Education Temple University, Philadelphia, Pennsylvania 19122
Associate Project Director	-	Dr. Adolf Panitz, National Occupational Competency Testing Project Plaza Seven Office Building 1202, Route 7 Latham, New York 12110

• CONSORTIUM REPRESENTATIVES BY REGION (1972)

REGION I

Connecticut - Fred Okula, Consultant, Trade and Industrial Education State Department of Education, State Office Building Box 2219 - Room 343, Hartford, Connecticut 06615

Maine - Dr. Arthur O. Berry, Director, Department of Industrial Education and Technology, University of Maine at Portland, College Avenue, Gorham, Maine 04038

Massachusetts - Dr. William Thomas, State Department of Education 182 Tremont Street, Boston, Massachusetts 02111

New Hampshire - Walter Miner, Department of Education, Division of Vocational-Technical Education, Stickney Avenue Concord, New Hampshire 03301

Rhode Island - Dr. Edward J. Medeiros, Chief, Department of Education, Office of Vocational Education 25 Hayes Street, Providence, Rhode Island 02908

Vermont - Walter E. Purvis, Jr. Assistant Professor Vocational Education and Technology Department University of Vermont, 105 Agricultural Engineering Building, Burlington, Vermont 05401

REGION II

New Jersey - Dr. Carl Schaefer, Professor, Graduate School of Education, Rutgers, The State University Department of Vocational-Technical Education New Brunswick, New Jersey 08903

New York - Dr. Gordon G. McMahon, Director, Department of Vocational-Technical Education, State University of New York, Oswego, College of Arts and Science Oswego, New York 13126

Puerto Rico - Dr. Ramon Mellado, Secretary of Education Department of Education, Vocational-Technical Education, P.O. Box 181, Hato Rey, Puerto Rico 00919

Virgin Islands - Albert Ragster, Sr., Department of Education Vocational-Technical Education, Charlotte Amalie St. Thomas, Virgin Islands 00801

REGION III

Delaware	- Donald E. Dunkle, State Supervisor, Trade and Industrial Education, Department of Public Instruction Townsend Building, Dover, Delaware 19901
Maryland	- Dr. Kenneth Stough, University of Maryland Division of Industrial Education College Park, Maryland 20742
Pennsylvania	-
Virginia	- Dr. Lester Duenk, Associate Professor Virginia Polytechnic Institute, Department of Vocational-Industrial Education, 2119 Derring Hall Blacksburg, Virginia 24061
West Virginia	- J. Jackson Townsend, State Supervisor, Vocational-Industrial Education, 1900 Washington Street, East Charleston, West Virginia 25303
Washington, D.C.	- Paul E. Cawein, State Director, Presidential Building, Suite 1001, 415 - 12th St., N.W. Washington, D.C. 20004

REGION IV

Alabama	- J.C. Lindley, State Supervisor, Trade and Industrial Education, Department of Education, State Office Building, Montgomery, Alabama 36104
Florida	- Dr. James Selman, Associate Professor, Industrial Education, College of Education, University of South Florida, Tampa, Florida 33620
Georgia	- Dr. Elic Cundiff, Assistant Professor, Trade and Industrial Education, University of Georgia 629 Aderhold Hall, Athens, Georgia 30601
Kentucky	- Dr. Ralph D. O'Brien, Specialist, Instructional Materials Lab, University of Kentucky - Room 151 - Taylor Education Building, Lexington, Kentucky 40506
Mississippi	-
North Carolina	-
South Carolina	-

REGION IV (continued)

Tennessee - Dr. Joe L. Reed, Professor and Head, Industrial Education Department, University of Tennessee Knoxville, Tennessee 37916

REGION V

Illinois -

Indiana - Dr. Max Eddy, Head Teacher Trainer, Trade and Industrial Education, Purdue University Lafayette, Indiana 47907

Michigan - Carl Stearns, Supervisor, Secondary Unit Department of Education, Division of Vocational Education, Box 928, Lansing, Michigan 48904

Minnesota - Bill Jagusch, Supervisor, Program Evaluation Unit Vocational Division, Minnesota Department of Education, Centennial Building St. Paul, Minnesota 55101

Ohio - Dr. Harry F. Davis, Assistant Director, Division of Vocational Education, 612 State Office Building Columbus, Ohio 43215

Wisconsin - George R. Kinsler, Chief, Trade and Industrial Education, Wisconsin Board of Vocational, Technical and Adult Education, 137 E. Wilson Street Madison, Wisconsin 53703

REGION VI

Arkansas - J. Marion Adams, Associate Commissioner for Vocational, Technical and Adult Education Department of Education, Arch Ford Education Building, Little Rock, Arkansas 72201

Louisiana -

New Mexico - Bill Jackson, State Supervisor, Trade and Industrial Education, Department of Vocational Education Capitol Building, Santa Fe, New Mexico 87501

Oklahoma - Charles T. Haraughty, Assistant State Supervisor Trades and Industrial Education, 1515 W. 6th Street Stillwater, Oklahoma 74074

REGION VI (continued)

Texas - Eugene Fisher, Vocational-Industrial Teacher Educator
Engineering Extension Service, Texas A & M University
F.E. Drawer "K", College Station, Texas 77843

REGION VII

Iowa - Howard R. Hammond, Consultant, Career Teacher
Education, Department of Public Instruction
Grimes State Office Building, Des Moines, Iowa 50319

- Dr. William Wolansky, Professor in Charge of
Industrial Education, Iowa State University of Science
and Technology, 202 Industrial Education Building
Ames, Iowa 50010

Kansas -

Missouri - Robert Robison, Director, Industrial Education
State Department of Education, P.O. Box 480
Jefferson City, Missouri 65101

Nebraska - Dr. James Miller, Director, Center for Vocational
and Technical Education, Kearney State College
Kearney, Nebraska 68847

REGION VIII

Colorado - Dr. Milton Larson, Professor, Department of
Vocational Education, Colorado State University
Fort Collins, Colorado 80521

Montana - Mr. Thad E. Diebel, Dean, Vocational-Technical
Division, Northern Montana College,
Havre, Montana 59501

North Dakota - Carrol E. Burchinal, Director, Vocational Education
State Office Building, 900 E. Boulevard Avenue
Bismarck, North Dakota 58501

South Dakota - Dr. Thomas C. Stone, Chairman, Division of Vocational
and Industrial Education, Southern State College
Springfield, South Dakota 57062

Utah - Dr. Neill Slack, Dean, Vocational-Technical-
Industrial Education, Utah State University
Logan, Utah 84321

REGION VIII (continued)

Wyoming	- Dean P. Talagan, Chief, Occupational Education Department of Education, Cheyenne, Wyoming 82001

REGION IX

Arizona	- Marvin Seglem, State Supervisor, Trade and Industrial Education, 412 Arizona State Building Phoenix, Arizona 85007
Guam	-
Hawaii	- Dr. Lawrence F.H. Zane, Director, EPDA Graduate Fellowship Program for Prospective Community College Faculty, University of Hawaii, 1776 University Avenue Honolulu, Hawaii 96822
Samoa	- Richard Reinhart, Coordinator of Vocational Education The Community College of American Samoa Pago Pago, American Samoa 96920
California	- Dr. David Allen, Coordinator, Professional Resource Development Section, University of California 1003 Wiltshire Blvd., Santa Monica, California 90401
Nevada	- Jack Bobay, State Supervisor, Trade and Industrial Education, Department of Education, Vocational- Technical & Adult Education Branch Carson City, Nevada 89701

REGION X

Alaska	- Clarke Damon, Department of Education, Division Vocational Education, Pouch F, Alaska Office Building, Juneau, Alaska 99801
Idaho	- John A McDaniel, State Supervisor, Trade and Industrial Education, State Board for Vocational Education, 518 Front Street, Boise, Idaho 83702
Oregon	- Larry Mathews, Department of Vocational Education Oregon State Department of Education 942 Lancaster Drive, N.E., Salem, Oregon 97310
Washington	- Dr. Owen J. Shadle, Acting Chairman, Central Washington State College, Department of Technology and Industrial Education Ellensburg, Washington 98926

APPENDIX B

* FUNCTIONS OF THE NATIONAL OCCUPATIONAL COMPETENCY TESTING SERVICE FOR VOCATIONAL INDUSTRIAL/TECHNICAL EDUCATION

To: State Directors of Vocational Education

From: Dr. C. Thomas Olivo, Director
National Occupational Competency Testing Project

The ultimate goal of occupational competency testing on a national scale is to improve the quality of instruction in Vocational Industrial/Technical Education by teachers who have demonstrated occupational competency, as recognized by labor and industry. The testing effort is intended to complement the efforts of each state. Incorporated in this procedure are flexibility and state control over the use and application of the test results.

National Occupational Competency Testing Services for Vocational Industrial/Technical Education relate to the following eight major functions. These functions will be reviewed and refined by further deliberations by representatives in the National Consortium.

I. TEST PLANNING AND COORDINATION

A. Manpower assessment of needs for Trade and Industrial/Technical Education teachers. This information will be basic to determine the development of tests in particular fields.

B. Coordination of a national effort -- conservation of human and material resources -- determination of centers for certain geographic areas in which to conduct tests and the formation of a cadre of examiners to administer tests.

C. Continuous analysis of the state-of-the-art to assure the incorporation of the best and most effective hardware and software into occupational competency testing.

D. Establishment of National Testing Institute (Center) and national planning activity for test planning, development and administration.

II. TEST DEVELOPMENT

A. Conducting in-depth occupational and task analyses as foundational to test development.

B. Preparation of occupational competency tests incorporating the best and most modern information and experiences in test development.

* Functions as developed at National Consortium Meeting in Chicago, March 13-14, 1970.

C. Evaluation and refinement of occupational competency tests to meet higher acceptable standards.

D. Optimum test development at minimum cost with maximum efficiency and effectiveness.

E. Computerized functional techniques for item analysis, validation and reliability studies and reporting to the states.

F. Establishing a multi-purpose test bank for continuous updating of test content and extension of services.

III. TEST ADMINISTRATION

A. Setting up a central national resource and depository of up-to-date information and materials.

B. Establishment of central stores for requisitioning tests and services relative to their administration.

C. Establish appropriate authorized regional test centers for combinations of states requesting such services.

D. Central scoring of written tests and assistance on performance test evaluations.

E. Print-outs with immediate results available to states for analysis.

F. Continuation of a national effort to coordinate and make total testing efforts most effectively.

G. Establishing nationally accepted procedures for the analysis of trade experience as foundational for the fulfilling of collegiate requirements of trade competence.

IV. RESEARCH

A. Statistical analyses to establish standards, validity, reliability, relevance to occupational requirements.

B. Relationships with behavioral, attitudinal, manpower and other research.

V. TEST REPORTING

A. Natural source for studying test data and experience and the preparation of significant findings, cutting across public and private institutions and agencies, military services, etc.

VI. FISCAL MANAGEMENT AND ACCOUNTING

A. Develop tests through adequate external fundings with minimum cost to the states (duplication of effort with high hidden costs will be reduced and eliminated).

VII. TRAINING FUNCTION

A. Training of test personnel and examiners in the accuracy of interpretation and relevance of tests to the individual and the requirements of each state.

VIII. ANCILLARY AND RELATED SERVICE FUNCTION (Possible examples)

A. Correlation with services and activities concerning preemployment and related vocational industrial/technical education programs for adequate measures of occupational competency of students and relationship of such testing to employment.

B. Coordination with military testing and application of outcomes toward advanced standings.

C. Coordination with labor and industry efforts relative to methods and procedures of appraising occupational competency.

cc: Head, State Industrial Teacher Educator
Head, State Supervisor of Trade and Industrial/Technical Education
Principal Investigators and Planning Committee
Project Officer

- FRAMEWORK FOR MEMBERSHIP IN THE CONSORTIUM OF STATES*

To: State Directors of Vocational Education

From: Dr. C. Thomas Olivo, Director
National Occupational Competency Testing Project

In a Consortium of States, each member freely and voluntarily joins in a common undertaking; namely, that of supporting a National Occupational Competency Testing Program for vocational industrial/technical education. Membership in the Consortium involves certain responsibilities and obligations.

Group I represents basic understandings, as beginning steps, to establish a National Consortium of States, as a vehicle for coordinating the planning of a National Occupational Competency Testing Program.

A. The state designates an experienced, knowledgeable representative who will coordinate competency test activities in his state for vocational industrial/technical education teachers with the National Occupational Competency Testing Institute.

B. The state agrees to participate and to pay the expenses of its representatives to an annual meeting of the Consortium. In the first instance, the Consortium will establish conditions of responsibility for membership.

Group II identifies major organizational, administrative and operational items that should be further defined, explored and acted upon (through channels) by the respective members, constituting the Consortium.

A. Agreement to use the tests and services of the Institute as the only competency test for the occupations as they are developed.

B. Utilizing the services of the National Occupational Competency Testing Institute, through payment for examinations determined by the state, at a minimum cost established by the Governing Board of the Consortium.

C. Agreement to use the occupational competency tests solely for the purposes intended.

D. Agreement not to duplicate the occupati nal competency tests for any other purpose.

E. Assurance to the security of the occupational competency tests.

*Framework as presented and reviewed by participants to the National Consortium Meeting in Chicago on March 13 and 14, 1970.

F. Cooperation in returning the tests and furnishing data necessary for research and further occupational competency test development.

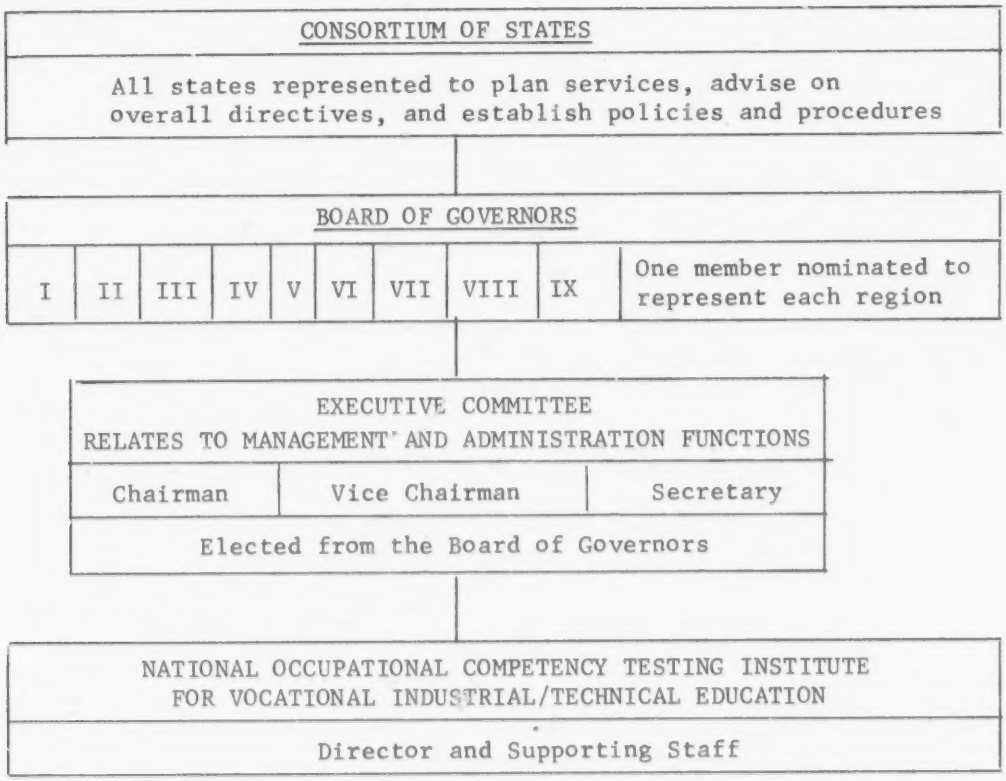
G. Support to Consortium effort to secure external funds, as approved by the Governing Board.

H. Agreement by the states to coordinate their occupational competency testing efforts with those of the Consortium and to share knowledge and experiences.

I. Agreement to abide by the Consortium Board's decisions, insofar as they are not in conflict with established state policy.

As previously stated, Group II suggests conditions for Consortium membership. To reemphasize, these conditions are subject to clarification, revision and acceptance by the Consortium.

III. SUGGESTED STRUCTURE FOR THE CONSORTIUM TO MANAGE AND ADMINISTER THE PROGRAM



cc: Head, State Industrial Teacher Educator
Head, State Supervisor of Trade and Industrial-Technical Education
Principal Investigators and Planning Committee
Project Officer

APPENDIX C

STATE-OF-THE-ART LITERATURE/EXPERIENCE SEARCH

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
Plaza Seven Office Building 1202 Route 7
Latham, N. Y. 12110 Phone (518) 785-1524

Dr. C. Thomas Olivo
Director

Dr. Adolph Panitz
Associate Director

October 10, 1969

• Letter to State Directors of Vocational Education,
Industrial Teacher Educators,
Researchers in Manpower and Vocational Education

Dear _____:

The occupational competency testing of teachers of trade, industrial/technical education has been of tremendous concern to state directors, supervisors, industrial teacher trainers, and others. To determine whether or not it is possible and practical to coordinate the efforts of many states in a systematic approach to the problem, a grant has been awarded to the Graduate School of Education, Rutgers University.

A representative planning committee experienced in all aspects of occupational competency testing has met to establish overall directions and guidelines. C. Thomas Olivo will serve as Project Director; Adolf Panitz, Associate Director; with Carl Schaefer, Melvin Barlow and Richard Nelson serving as Principal Investigators.

The first step in the Project is a national comprehensive survey of the "state-of-the-art" in vocational industrial/technical education, industry, government, etc.

To achieve as broad a base as possible, your assistance is essential. Specifically, the following items are needed from your state:

1. A list of titles of tests which have been prepared,
2. A list of titles of tests in preparation,
3. Plans for the future development of occupational competency tests or testing,

Principal Investigators

Dr. Carl Schaefer
Rutgers University, New Jersey

Dr. Melvin Barlow
University of California, Los Angeles

Dr. Richard Nelson
State Department of Education, Sacramento

"Consortium for Occupational Competency Testing of Trade and Industrial/Technical Teachers." Research Project Grant 8-0474, Bureau of Research, United States Office of Education to the Graduate School of Education, Rutgers University.

2

4. Samples of examinations, written - practical, in (a) machine trades, (b) automotive trades, (c) electronics (communications),

5. Guidelines for the construction of tests,

6. Instructions for examiners giving tests,

7. Instructions for candidates taking tests, and

8. Methods of evaluation.

This material will be treated with the utmost confidence. It will not be duplicated or released to anyone.

Separate copies of this letter and the attached supplement are being directed to the head industrial teacher trainer and state supervisor of trade and industrial education.

Because of the importance of accurately measuring the occupational competency of teachers, we trust you will lend encouragement to your staff in supporting this undertaking.

Thank you.

Cordially yours,

Adolf Panitz
Associate Director

AP:mas

cc: Head State Supervisor of Trade and Industrial/Technical Education

Head Industrial Teacher Educator

Researchers in Manpower and Vocational Education

SOLICITATION OF RESOURCE MATERIALS FROM
INDUSTRY, MILITARY AND OTHER SOURCES

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

Plaza Seven Office Building 1202 Route 7
Latham, N. Y. 12110 Phone (518) 785-1524

Dr. C. Thomas Olivo
Director

Dr. Adolph Panitz
Associate Director

November 5, 1969

V_____ Company
Division of Union Company
Chicago, Illinois

Dear Mr. _____:

With the rapid expansion of vocational education in the nation's high schools and junior colleges, the selection and training of tradesmen and technicians for teaching has become a serious problem.

The level of competence is the keystone upon which the whole instructional program is built. Thus, the administrator (and the industry whom the program serves) must have assurance that the range of occupational competence is adequate to meet a full spectrum of the needs of both youth and adults.

The evaluation of the occupational competence of individuals from industry, who wish to become teachers in vocational education programs, has become a matter of concern to administrators and teacher educators.

A number of states require successful passing of competency examinations for certification. Most of these examinations are of the pencil and paper variety. A few involve actual performance in simulated job situations. Constructed by vocational educators and skilled craftsmen, these instruments show little evidence of validation according to accepted test procedures. Duplication of effort places a heavy drain upon the limited resources of the states.

The National Occupational Competency Testing Project, under the sponsorship of Rutgers University, has been established to investigate the feasibility of developing a center for occupational competency testing.

Principal Investigators

Dr. Carl Schaefer
Rutgers University, New Jersey

Dr. Melvin Barlow
University of California, Los Angeles

Dr. Richard Nelson
State Department of Education, Sacramento

"Consortium for Occupational Competency Testing of Trade and Industrial/Technical Teachers." Research Project Grant 8-0474, Bureau of Research, United States Office of Education to the Graduate School of Education, Rutgers University.

The first step in this Project is a survey of the "state-of-the-art" to determine the extent to which occupational competency is evaluated in industry; the methods and procedures employed; how validation and reliability were established.

A review of the published literature reveals only fragmentary reports about the use of performance tests, simulation techniques and written tests intended to measure occupational competence. Yet, it is known that work has been done in this area by various states, government agencies, private contract research groups, and industry. Unfortunately, most of the research is not generally accessible.

It is essential for our research team to collect and summarize as much relevant testing information as possible, conduct field trips for observation of existing practices and procedures, and eventually to prepare materials helpful to industry and vocational education.

We are inquiring whether your organization has done work in occupational competency testing and, if so, would you make this information available to our Project.

The success of the Project will have far reaching implications for vocational industrial/technical education and for its continuing contribution to the development of skilled manpower for this nation.

Very truly yours,

Adolf Panitz
Associate Director

• ORGANIZATIONAL AND INSTITUTIONAL CONTACTS

- Organizations in Vocational Education

  State Directors of Vocational Education or their equivalent in each State, District of Columbia, Virgin Islands, Puerto Rico.

  National Association of State Directors of Vocational Education (All Members).

  National Association of Industrial and Technical Teacher Educators (All Members).

  National Association of State Supervisors of Trade and Industrial Education (All Members).

  Research Committee of the American Vocational Association, Regions I to VIII.

  State Vocational Research Centers and Bureaus.

  National Vocational Research Center - Ohio State University.

  National Vocational Research Center - University of Wisconsin.

- Government Agencies

  United States Department of Commerce

  United States Department of Labor

  United States Department of Labor - Office of Manpower, Automation and Training

  Equal Employment Opportunity Commission.

  United States Civil Service Commission.

  New York State Civil Service Commission.

  New York State Department of Labor - Internal Training Division.
  Apprentice Training Division.
  Manpower Training Division.

  New York City Civil Service Commission - Professional and Technical Evaluation and Testing Division.

- Professional Organizations

  American Psychological Association, Washington, D.C.
  American Educational Research Association, Washington, D.C.
  National Council for Measurement in Education, Washington, D.C.
  Military Testing Association, Governor's Island, New York

- Private Organizations

American Institute of Certified Public Accountants
New York City

Associated Personnel Technicians, Wichita

Educational Testing Service (Visited) Princeton

Industrial Psychology, Inc., New York

McAnn Associates, Philadelphia

National League for Nursing, New York City

Psychological Institute
Lake Alfred, Florida

The Psychological Corporation (Visited)
New York City

The Psychological Research Corporation
New York City

Psychological Services, Inc.
Los Angeles

Science Research Associates, Inc., Chicago

American Transit Association
New York City

- Military Establishments

United States Air Force
Lackland Air Force Base, Texas

United States Air Force
Wright Patterson Air Force Base, Dayton (Visited)

United States Air Force
Lowry Air Force Base, Denver

United States Air Force
Personnel & Training, Research Center
San Antonio

United States Army Ordinance School (Visited)
Aberdeen, Maryland

United States Army
Signal Corps Training School (Visited)
Fort Monmouth, New Jersey

United States Army Enlisted Evaluation Center (Visited)
Indianapolis

United States Army
Armor Training Center
Fort Knox, Kentucky

United States Coast Guard
United States Coast Guard Training Center (Visited)
Governor's Island, New York

United States Navy Electronics Laboratory
San Diego

United States Navy
Great Lakes Naval Training Center (Visited)
Electronics Schools
Great Lakes, Illinois

- Trade and Industrial Organizations

American Association of Industrial Management (Visited)
New York City

American Management Association (Visited
New York City

Associated Electrical Industries
New York City

National Association of Manufacturers (Visited)
New York City

National Metal Trades Association
New York City

National Tool, Die and Precision Machining Association (Visited)
New York City

o Industrial Organizations

A. C. Electronics Division of General Motors
Public Relations Department
Milwaukee

Air Reduction Company, Inc. (Visited)
Personnel Department, New York City

American Can Company, New York City

American Car and Foundry (Visited)
Division A.C.F. Industries, Inc.
New York City

American Cyanamid Company
Personnel Division
Wayne, New Jersey

American Telephone and Telegraph Company (Visited)
New York City

Armco Steel Corporation, New York City

Bethlehem Steel Corporation (Visited)
General Offices, New York City

Buick Motor Division
Service Training Department, Flint

Cadillac Motor Car Division - General Motors
Service Training Department, Detroit

Delco-Moraine Division - General Motors
Personnel Department, Detroit

Delco Radio Division - General Motors
Public Relations Department
Kokomo, Indiana

E. I. duPont deNemours and Company
Wilmington

Foote Mineral Company
Exton, Pennsylvania

General Electric Company (Visited)
New York City

General Dynamics Company (Visited)
General Education Services
New York City

General Motors Corporation
Public Relations
Detroit

Inland Steel Products Company
Milwaukee

International Business Corporation
White Plains, New York

International Mineral & Chemical Corp.
Stokie, Illinois

Mead, Johnson and Company
Evansville, Indiana

Minnesota Mining and Manufacturing Co.
St. Paul

Owen-Illinois Glass Company
Toledo

Spartan Electric Company
Division of Spartan Corporation
Jackson, Michigan

Sperry Gyroscope Company (Visited)
Division of Sperry Rand Corp.
New Hyde Park, Long Island, N.Y.

Visking Company
Division of Union Carbide Company
Chicago

Western Electric Company (Visited)
Psychological Testing Department
New York City

Western Electric Corp. (Visited)
New York City

Westinghouse Electric Corp. (Visited)
New York City

- Labor Organizations

International Association of Machinists
1300 Connecticut Avenue N.W.
Washington, D.C.

International Union, United Automobile, Aerospace
and Agriculture Implement Workers of America - UAW
Detroit

National Joint Steamfitter-Pipe Fitter Apprenticeship Committee
U.A. Building
901 Massachusetts Avenue
Washington, D.C.

National Joint Apprenticeship and Training Committee for the
Electrical Industry
1730 Rhode Island Avenue
Washington, D.C.

United Brotherhood of Carpenters and Joiners of America
Apprentice and Training Department
Staten Island, New York

• GUIDE FOR VISITING TESTING CENTERS

Name of Center: _____ Date: _____

Address: _____

Individual in Charge: _____ Title: _____

Nature of Program:

Army: ____	Navy: ____	Airforce: ____
Civil Service:	____	Industry: ____
Manpower:	____	Civil Aeronautics: ____
Educational:	____	Private Organization: ____

GUIDELINES FOR INTERVIEW/OBSERVATIONS

1. For what purpose are occupational competency tests administered

   a) evaluate proficiency for job assignment?
   b) evaluate effectiveness of training program?

2. Is special personnel available for test development, special department -- other arrangements?

3. What special qualifications must these individuals possess?

4. What sequence of steps is followed in test construction?

5. How is test content determined -- by whom?

6. How are proficiency levels determined?

7. What procedures are followed to determine validity, reliability, comprehensiveness and recency of material?

8. How are tests kept up to date?

9. How valuable is the question pool?

10. What alternate forms are provided for the tests?

11. In designing performance test which approach has worked best in your program?

    a) Judgment of specialists
    b) Laboratory design and tryout

12. How have norms been established?

13. How have passing and failing levels been established?

14. For which areas of occupational competence are written tests used?

15. For which occupations and at what skill level are performance tests essential?

16. In what form is the evaluation expressed when both written and performance tests are used?

17. By whom have the examinations been administered?

18. What criteria have been established for evaluation performance test?

19. Will the center make the evaluation or rating forms available to the project?

20. What instructions are provided?

    a) to the candidate
    b) to the examiner

21. How is the testing program supported?

    a) financially
    b) attitude of individuals tested
    c) attitude of test administrators

22. How are the test results evaluated and utilized for the individual--for the program?

Other observations and comments.

A P P E N D I X D

PHASES II AND III GROUNDWORK FOR CONSORTIUM ORGANIZATION

- MEETING OF PRINCIPAL INVESTIGATORS, STAFF, PLANNING COMMITTEE, TEST ADMINISTRATORS AND STATE REPRESENTATIVES TO CONSORTIUM

May 25, 1971 - Hilton Inn, St. Louis, Missouri

Minutes - Session Two 8:30-11:30 A.M.

Present

Principal Investigators:

C. Thomas Olivo - Pennsylvania
Carl Schaefer - New Jersey

Project Officer:

Lawrence Braaten - Washington, D. C.

Staff:

C. Thomas Olivo - Pennsylvania
Adolf Panitz - New York

Planning Committee

Harry Davis for Byrl Shoemaker - Ohio
Edward Hankin - Georgia
George Kinsler for Merle Strong - Wisconsin
Gordon McMahon - New York
Ralph Orr for Robert Reese - Ohio

Test Administrators

Paul Bowdoin - Georgia
Milton Larson - Colorado
Ralph Orr - Ohio
Gordon McMahon - New York
Gerald LaBorde for Joe Reed - Tennessee

States' Representatives to Consortium

Thurman Bailey - Florida
Paul Bowdoin - Georgia
Lester Duenk - Virginia
Harry Davis - Ohio *
Eugene Fisher - Texas
Robert Hanson - Nebraska
Charles Haraughty - Oklahoma
Bud Jagusch - Minnesota
Bill Jackson - New Mexico
Hubert Worthy - Alabama
Marvin Seglem - Arizona
J. Marion Adams - Arkansas
John Meyer - California
M. G. Linson - Colorado
Fred Okula - Connecticut
Daniel Koble - Delaware
John McDaniel - Idaho
H. H. London - Missouri

States Representatives to Consortium (continued)

Present		Absent	
George Kinsler *	- Wisconsin	John Bunten	- Nevada
Gerald LaBorde *	- Tennessee	Walter Miner	- New Hampshire
Howard Hammond	- Iowa	William Reynolds	- Illinois
Alfred Newton	- South Carolina	Raymond Ross	- Vermont
George Russ	- New Jersey		
Doyle Stewart	- Kentucky		
Thomas Stone	- South Dakota		
William Thomas	- Massachusetts		

* Individuals serve in dual capacity
** Ten states reported budgetary out of state travel restrictions for the inability of their representatives to attend

In his welcoming remarks, Tom Olivo explained the reasons for calling a Consortium Conference of the designated state representatives at this particular time. Five major objectives governed the planning of the Agenda:

1. To bring everyone up to date on the materials developed by the staff during Phase One

2. Plans and activities in operation for Phase Two and Phase Three

3. Steps to be taken toward the formulation of the Consortium of States for Occupational Competency Testing

4. Groundwork necessary for the formulation of the Consortium

5. Structure and Procedures for the Occupational Competency Testing Project to become operational under a Consortium arrangement

Tom Olivo acknowledged the unstinting support of Carl Schaefer for guiding the administrative part, including the accountability to the U. S. Office of Education, through Rutgers University. He also expressed appreciation to Richard Nelson and Melvin Barlow for their helpful assistance. He pointed out that the four principal investigators represented California, New Jersey and New York. Equal appreciation was expressed for the efforts of the Planning Committee whose members, representing Connecticut, Georgia, New York, Ohio and Washington, provided counsel and support to the project. Particular thanks was expressed to Larry Braaten who guided the project through difficult budget times in the U. S. Office of Education to continuing financial support for Phase Three.

A Consortium of States for Occupational Competency Testing is concerned with the occupational competency of prospective teachers. To evaluate this competency, qualifying tests are needed. Although much time and effort has been expended to create valid and reliable instruments, funds and personnel have never been adequate to achieve the quality essential to national status recognition for

vocational teachers. Even such states as California, Florida and New York, who have been in the forefront of test development for many years, find themselves restricted by lack of adequate resources for the quality tests essential, in their judgment, for objective evaluation. With the support of the U. S. Office of Education, it is now possible to conduct a National Effort for the development of a series of high quality, valid and reliable tests which should form the foundation of a National Occupational Competency Program.

History and Future of Project

Carl Schaefer briefly reviewed the history of the efforts which lead to the project proposal and the granting of the funds for the National Occupational Competency Testing Project by the U. S. Office of Education, on the basis of the results achieved by the project staff and the responses by the states. He stated that the time is appropriate, the opportunity is here, now it is up to the states to support the work of the project and utilize its accomplishments. He expressed optimism and hope that the Consortium of States will become an operational reality.

U. S. Office of Education Support

Larry Braaten presented the greetings of the U. S. Office of Education and explained the conditions of the contract for Phase Three of the project and that thegrant contract had been mailed to Rutgers University. He explained that the delays encountered in getting financial support for Phase Two has resulted in a time extension of Phase Three until December 31, 1972. He further expressed his appreciation for the staffs' continuing effort during the long period when extension of the financial support experienced delay. He stated that the Occupational Competency Testing Project has been most productive of all the research the U. S. Office of Education has supported.

Review of Phase One

Tom Olivo briefly reviewed the achievements of Phase One and explained the need for additional data for the Machine Trades and Electronics Occupations (Communications) Tests.

State of Phase Two -- Selection of Major Test Areas:

This part of the project involved the selection of ten major areas for which tests are to be developed. The test areas were identified from U. S. Office of Education Enrollment Data, Manpower Data, and the responses of the states to questionnaires on which they listed their priorities.

Selection of Area Test Centers

Keeping in mind the National character of test development and the facilities needed to administer the tests in various sections of the country, certain individuals who have demonstrated their knowledge and understanding of occupational competency test development have been asked to serve as area test center administrators. These individuals will coordinate all efforts fortthe development of one test (consisting of a written and performance part), pilot

testing the test and make provisions for pilot testing all other tests developed in other sections of the country. To facilitate the identification of shops and laboratories and supportive testing centers all representatives were asked to complete a questionnaire on the number of candidates for each test and the geographic location where these tests might be given.

Utilization of Project Materials

Adolf Panitz described how the "State-of-the-Art" and the "Handbook for the Development and Administration of Occupational Competency Tests" might be used by the test administrator and the item writer. He emphasized that advisory planning committees for each test should involve representatives from several states adjacent to each regional center. An additional publication: "Directions for Area Test Center Coordination, Test Development and Test Administration" was distributed among all in attendance at the Conference. This publication was prepared by the project staff to insure that each test is developed in accordance with the procedures and standards established during Phase One. It contains the step-by-step procedures for area test center coordination, examples and work-sheets for test item preparation and performance item selection and the directions for conducting the written and performance examinations, as well as a listing of all materials to be submitted to the project at the completion of each test.

Plans and Action for Phase Three

Tom Olivo indicated that the ten test centers for Phase Two are of a pilot nature. In order to provide effective and quick service in all sections of the country additional test centers will have to be established. Phase Three will involve extended efforts in this direction and the development of twelve additional tests in major occupational areas. At the conclusion of the project a total of twenty-four tests are to be completed. A listing of additional major industrial occupations was submitted to all participants from which twelve occupations are to be selected for test development.

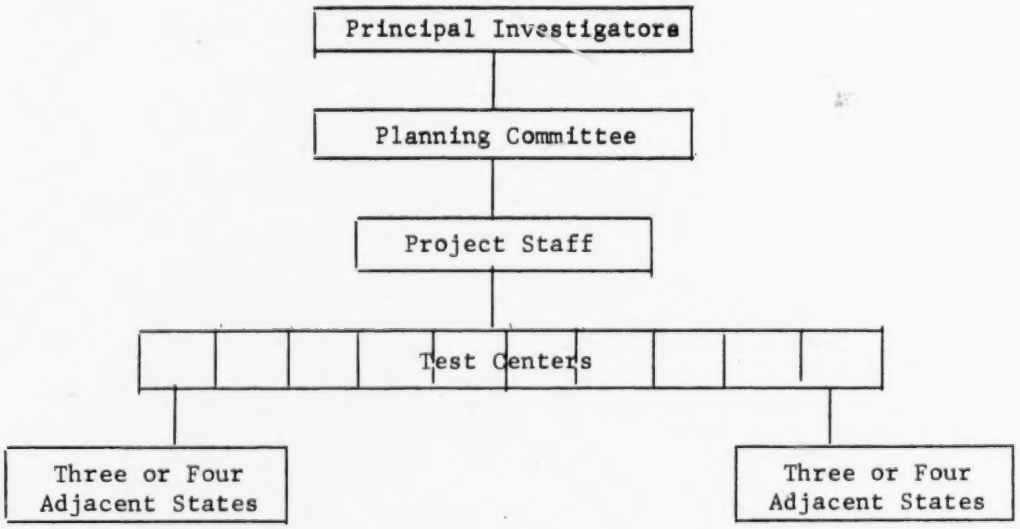
This presentation was followed by a discussion of various aspects of test development.

Gordon McMahon urged that test advisory committees are organized on a continuing basis to keep tests up to date. Carl Schaefer suggested that the test population be varied and include senior apprentices. Tom Olivo and Adolf Panitz stated that for pilot testing purposes and critical evaluation and refinement of the tests, the test population should consist of candidates who would normally be tested. Budget limitations confine the number of candidates to eight for each performance test in each area center. However, if more candidates are available and can be tested within the budget limitations, or if supplementary means are available, a larger number is desirable. For the determination of norms and standards the tests will be administered to different groups at a later date.

In the discussion on the purpose of the grid for test development, it was agreed that it is to be derived from the content analysis and form the proportions of various subdivisions in each occupation for which test items must be developed. The grid enables the test constructor to identify the common core as well as the special requirements for various competency levels.

Organizational Structure of the Consortium

The present structure of the National Occupational Competency Testing Project was described by Tom Olivo as follows:



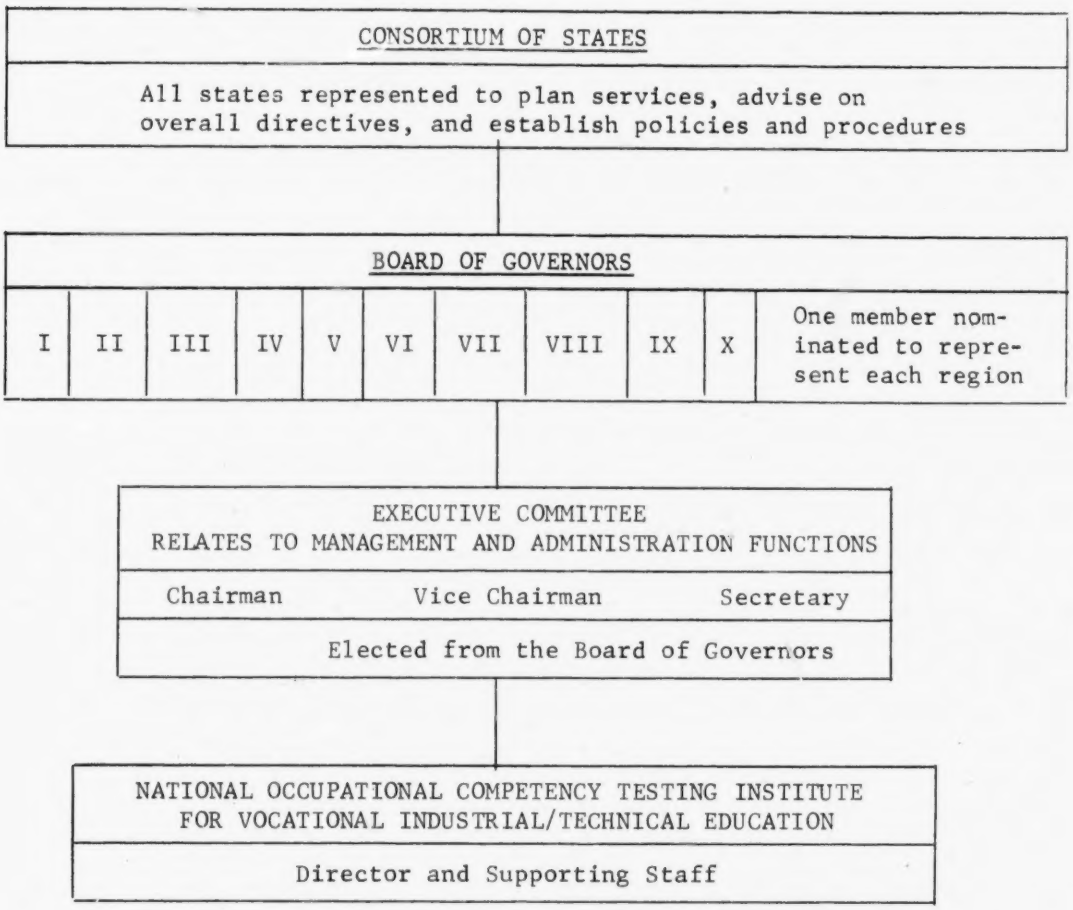
The efforts of the staff are governed by the directions of the Principal Investigators and the Planning Committee. A Consortium of States for Occupational Competency Testing requires the involvement of as many states as possible in test development and administration. A successful beginning has been made and will be extended during Phase Three.

Tom Olivo emphasized the need for the establishment of a Governing Body for the Consortium which will become operational when the responsibility of the Principal Investigators and the Planning Committee has been discharged by December 1972.

He briefly reviewed the "Function of the National Occupational Testing Service for Vocational Education" which was developed at the National Consortium Meeting in Chicago, March 13-14, 1970 (copy attached).

He also reviewed the "Framework for Membership in the Consortium of States" which was presented to be reviewed by and supported by the participants at the National Consortium Meeting in Chicago, March 13-14, 1970 (sample attached).

During the ensuing discussion the following structure was developed:



Alternatives

Tom Olivo presented a five alternate plan under which all or part of the work of the project can be continued after the completion date December 31, 1972.

Proposal I. A National Occupational Competency Testing Center governed by a National Administrative Board consisting of one representative of each of the ten regions. A Planning Committee of all state representatives (50) (divided into subcommittees to deal with special problems) and an Administrative Staff consisting of director, test specialist, secretarial service, and facilities for test reproduction, scoring and evaluation.

Proposal II. Assign project to a recognized institution under the title, National Occupational Competency Testing Project at the

(Name of the Institution)

An Advisory Administrative Board with one elected representative would function regarding the service, administration and personnel.

A Planning Committee consisting of delegates from all the states - subcommittees for special functions.

Proposal III. Select one recognized institution or research center to serve under the title of National Occupational Competency Testing Program as a clearing house, to provide information on available tests, refer inquiries to institutions which have developed tests, whether they are available and at what cost, and carry on test development on its own.

An Administrative Committee would serve in an advisory capacity and assist the institution with providing sources of information. Such a clearing house may work well with the U. S. Office of Education.

Proposal IV. Select a number of presently active test centers with a U. S. Office of Education representative acting as National coordinator. The clearing house would make tests available to the states according to their needs at a net cost in cooperation with the test centers. A National committee would serve to define needs and recommend improvements to the various centers--purely in an advisory capacity.

Proposal V. Request a private organization to carry on the National Occupational Competency Project and administer the available tests, develop new tests, provide services and research with the states purchasing the tests according to their needs.

Tom Olivo suggested that some informal discussion be devoted to these alternatives during the lunch recess.

Meeting adjourned at 11:30 A.M.

Minutes - Session Three 1:30-3:05 P.M.

Tom Olivo conducted the continuing discussion on the Structure of the Consortium. The consensus of opinion was that the success or failure of a Consortium of States rests on their willingness to support a National Occupational Testing Center financially.

Carl Schaefer stated emphatically that state commitment is needed, that the actual cost to the states to make the Consortium operative without U. S. Office of Education is relatively small. While there may be a number of administrative problems to be resolved which differ in each state, a way must be found to accomplish this. We are close to a real breakthrough to raise the vocational teacher to a higher recognized professional level. He then explained a suggested method through which the various states could apportion vocational research funds to the Consortium (sample attached).

In the ensuing discussion the following points were made:

Tom Olivo: A National Occupational Competency Test Center would provide certain spin-off services, such as special examinations for vocational school youth.

Carl Schaefer: The exact cost of each examination cannot be determined at this particular time and will depend upon the number of tests to be administered.

Ed Hankin: The fees to be charged will have to cover central office and local administrative costs.

Tom Olivo: Each test center follows the procedure of charging or not charging candidates for taking the test.

Gordon McMahon: Tests are used for several purposes--admission to teacher education programs, certification and admission to collegiate programs. States should strive for a uniform procedure to include all three programs.

Thurman Bailey: Some states have to make a distinction in fees for certification and matriculation in a degree program.

Alternative proposals involved fixed membership fee plus cost for service, direct purchase of tests by the states, purchase of tests at a higher rate for non-members until membership fee is reached.

Concern was expressed by Harry Davis to examine the needs of the regions to keep individuals now interested and active involved in the project even after the change over.

Ed Hankin recommended stronger involvement of the State Directors of Vocational Education.

In summary, Tom Olivo urged that the states designees to the Consortium identify one individual who would represent their region on the proposed Governing Board.

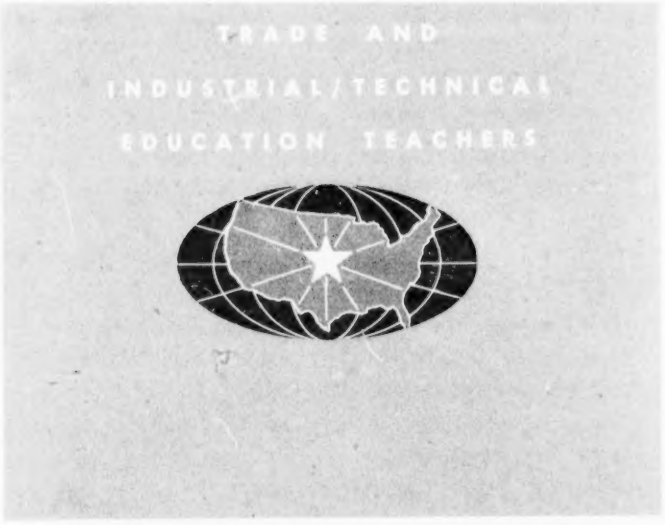
Ed Hankin proposed a Resolution that those state representatives present at the Conference contact others in their region to select and nominate a representative to the Governing Body.

This Resolution was approved unanimously.

Adolf Panitz is to provide each representative present with the names of the representatives of other states.

After thanking all present for their contribution and participation, the Meeting was adjourned at 3:05 P.M.

OCCUPATIONAL COMPETENCY TESTING



A CONSORTIUM OF STATES PROJECT

PHASES II AND III

- TEST DEVELOPMENT AND ADMINISTRATION
- FIELD TESTING: VALIDITY, RELIABILITY, FUNCTIONAL PLANNING
- NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE
- CONTINUING STRUCTURE AND ORGANIZATION FOR CONSORTIUM

THE NEED FOR A NATIONAL OCCUPATIONAL COMPETENCY TESTING PROGRAM

The continuing expansion of vocational industrial/technical education programs requires the selection and development of significant numbers of teachers with demonstrated occupational competence. Thus, objective measures are urgently needed to validate both the skill and technical competence of the prospective teacher.

Phase 1 demonstrated with crystal clearness the feasibility of:

- Establishing a Consortium of States for purposes of planning, developing, administering, and carrying on related research.
- Acceptance by the States of tests prepared and administered according to a representative National Plan to validate the occupational competence of prospective teachers.
- Establishing approved Regional Test Centers and selecting capable Test administrators and examiners from many geographic locations.

Phase 1 also established that:

- The States are concerned about the reliability and validity of occupational competency tests and their limited resources to develop such tests.
- A National effort is practical, eliminates duplication of effort, produces a higher quality test with reliability and validity, and effects substantial economies.
- Vocational industrial/technical education teachers will gain greater professional stature and recognition through a National Occupational Competency Testing Program.
- A National effort provides flexibility for all States to validate occupational competence through the use of these tests, giving wide latitude for each State in interpreting the results.

THE CONSORTIUM CONCEPT

The investigation during Phase 1 resulted in:

- Forty four States endorsing the continuation of the project and services.
- Acceptance by the States of occupational competency examinations developed through National effort.
- An expressed need to establish a permanent Consortium of States to achieve educational productivity (reliability, validity, effectiveness, and efficiency through utilizing the processes and products of the project).

PROJECT GOA

PHASE I ACCOMPLISHMENTS

- Established the feasibility of forming a Consortium of States for Occupational Competency Testing.
- Established the practicality of making multiple-level occupational competency analyses on an acceptable nationwide base.
- Made comprehensive analyses of one major industrial occupation constellation and one technical; developed and field tested these tests in four regional locations.
- Completed the most comprehensive literature survey and on-site study of efforts by public and private industries, military and other organizations and reported the findings in the "State-of-the-Art."
- Prepared a "Handbook" and other guides for test development and administration.

PHASE II GOALS

- Develop ten written and performance occupational competency tests (including scopes, scoring and other materials for test administrators, examiners and examinees).
- Set up a training program to develop a cadre of test administrators, developers and examiners in ten different regions.
- Field test each of the ten tests in different Regional Test Centers to establish validity, reliability and the practicality of implementing the tests and concepts.
- Provide occupational competency testing services to the Consortium of States by actually testing candidates through multiple-state arrangements.
- Explore the desirability of a National Occupational Competency Testing Institute for reproduction, distribution, scoring, making statistical analyses, and reporting back to the states.
- Develop uniform scoring techniques and guidelines for administering tests and prepare interpretive materials for establishing acceptable standards.

PHAS

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PROJECT GOALS

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- Prepared a "Handbook" and other guides for test development and administration.

PHASE II GOALS

◆ Develop ten written and performance occupational competency tests (including scopes, scoring and other materials for test administrators, examiners and examinees).

◆ Set up a training program to develop a cadre of test administrators, developers and examiners in ten different regions.

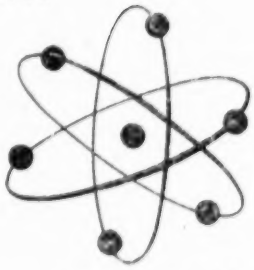
◆ Field test each of the ten tests in different Regional Test Centers to establish validity, reliability and the practicality of implementing the tests and concepts.

◆ Provide occupational competency testing services to the Consortium of States by actually testing candidates through multiple-state arrangements.

◆ Explore the desirability of a National Occupational Competency Testing Institute for reproduction, distribution, scoring, making statistical analyses, and reporting back to the states.

◆ Develop uniform scoring techniques and guidelines for administering tests and prepare interpretive materials for establishing acceptable standards.

PHASE III GOALS



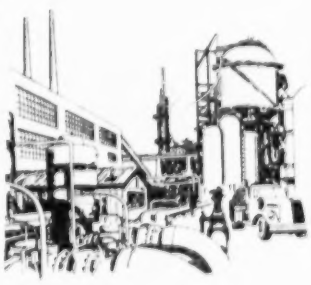
◆ Extend the development, testing and analyses functions to twelve additional trades and/or industrial technical occupation constellations.

◆ Carry on identical field testing in twelve new Regional Test Centers with additional multi-state test administrators, developers and examiners.

◆ Structure an acceptable plan for the organization and administration of the national occupational competency testing program under a Consortium of States organization.

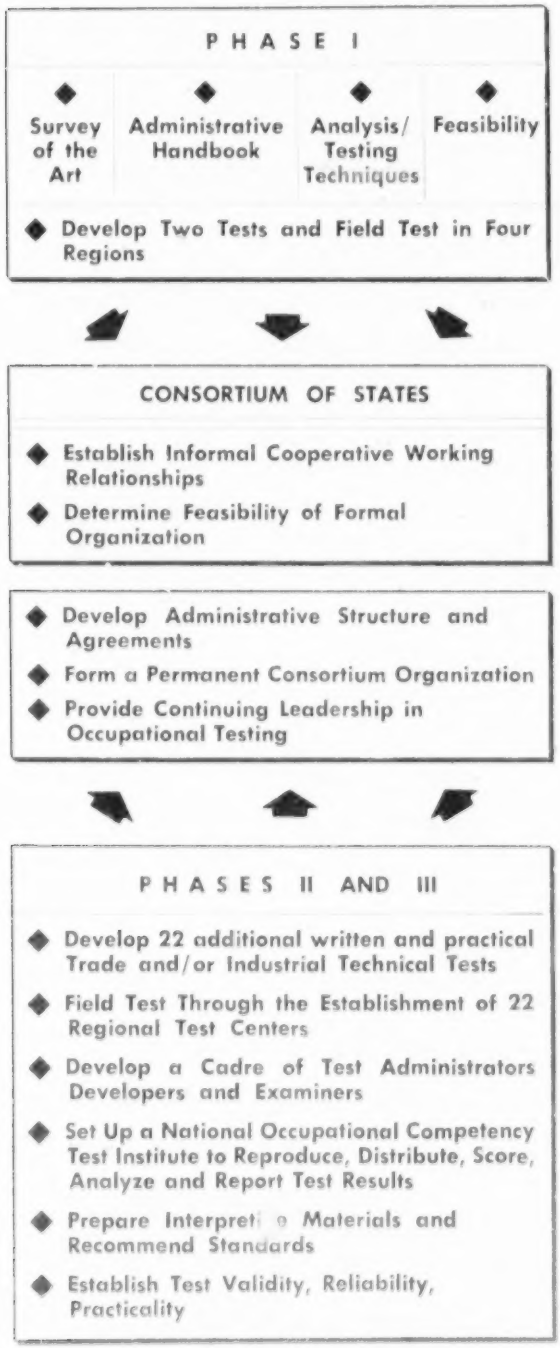
◆ Assess proposals from professional groups and agencies to continue the program and services; maintaining the intergrity of the whole effort, processes and products.

◆ Terminate Phases I, II and III of the project with a feasible and acceptable plan to transfer all functions, responsibilities, processes and products to a permanent Consortium of States organization.



◆ Prepare a final cumulative report for Phases I, II and III and disseminate salient test information.

SCOPE OF THE NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT


PHASE I
Survey of the Art
Administrative Handbook
Analysis/ Testing Techniques
Feasibility
Develop Two Tests and Field Test in Four Regions
CONSORTIUM OF STATES
Establish Informal Cooperative Working Relationships
Determine Feasibility of Formal Organization
Develop Administrative Structure and Agreements
Form a Permanent Consortium Organization
Provide Continuing Leadership in Occupational Testing
PHASES II AND III
Develop 22 additional written and practical Trade and/or Industrial Technical Tests
Field Test Through the Establishment of 22 Regional Test Centers
Develop a Cadre of Test Administrators Developers and Examiners
Set Up a National Occupational Competency Test Institute to Reproduce, Distribute, Score, Analyze and Report Test Results
Prepare Interpreti e Materials and Recommend Standards
Establish Test Validity, Reliability, Practicality

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT .... MODEL FOR ORGANIZATIONAL STRUCTURE
December 4, 1972 - Chicago, Illinois

POSSIBLE FUTURE ORGANIZATION MODEL

NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE

BOARD OF GOVERNORS

NASDVE**	DISTRIBUTION	AGRICULTURE	AND OTHER VOCATIONAL FIELDS
TRADES & INDUSTRIES	BUSINESS	HEALTH INDUSTRIES	

PROGRAMS AND SERVICES
SIMILAR TO TRADES AND INDUSTRIES MODEL

CONSORTIUM ORGANIZATION, ADMINISTRATIVE BOARDS AND EXECUTIVE COUNCILS

MODEL FOR ORGANIZATION AND MANAGEMENT

Program: Trades and Industries Education

CONSORTIUM OF STATES
STATE DESIGNATED REPRESENTATIVE FROM TRADES AND INDUSTRIES
EX-OFFICIO: COMMITTEE OF NASDVE
OFFICERS: EXECUTIVE COMMITTEE

Elect

ADMINISTRATIVE BOARD

REGIONS: I | II | III | IV | V | VI | VII | VIII | IX | X

ROTATE: THREE YEAR TERMS

3 SS | 3 TT | 3 TEACHERS

OFFICERS: EXECUTIVE COUNCIL

EX-OFFICIO: PROJECT DIRECTOR
REPRESENTATIVE NASDVE **

Elect

EXECUTIVE COUNCIL

Chrm | Vice Chrm. | Secty/ Treas.

EX-OFFICIO: **
PROJECT DIRECTOR
REP.: NASDVE

MODEL FOR NOCT INSTITUTE ADMINISTRATION

Program: Trades and Industries Education

NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE

Test Planning & Development	Coordination, Management & Reporting	Special Testing Contracts	Research & Experiment	New Services
	Regional Center Services	* *Possible	* Additional	* Services

PROJECT DIRECTOR :

STAFF :

MODEL FOR ADDITIONAL VOCATIONAL EDUCATION PROGRAMS RELATING TO OCCUPATIONAL COMPETENCY

PROGRAMS
DISTRIBUTIVE EDUCATION
BUSINESS EDUCATION
ET AL VOCATIONAL EDUCATION PROGRAMS
CONSORTIUM OF STATES

ADMINISTRATIVE BOARD

EXECUTIVE COUNCIL

MODEL FOR ADDITIONAL VOCATIONAL PROGRAMS WOULD FOLLOW TRADES AND INDUSTRIES MODEL

** EX-OFFICIO (1) A Representative of NASDVE would serve on each Board, Council and Consortium of States, for each Program Area. One regular member on the Institute Board of Governors would represent NASDVE.

(2) The Principal Investigators and Project Staff would serve to December 31, 1974.

• MODEL FOR ORGANIZATIONAL STRUCTURE

A P P E N D I X E

TEST DEVELOPMENT AND ADMINISTRATION

- SUGGESTED CONSULTANT TEST DEVELOPMENT/ADMINISTRATION AGREEMENT

RUTGERS UNIVERSITY
THE STATE UNIVERSITY OF NEW JERSEY
New Brunswick, New Jersey 08903

Agreement made this _____ day of _____, 1972, by and between Rutgers University, The State University of New Jersey (hereinafter called Rutgers) and _____ (hereinafter called Consultant).

Whereas, Rutgers has received a contract from the Office of Education, Number OEG-2-9-100474-1044, titled, A Consortium for Occupational Competency Testing of Trade and Industrial/Technical Teachers, and

Whereas, Rutgers desires to have the Consultant participate in the Project, and the Consultant desires to render such services for Rutgers.

Now, therefore, in consideration of the premises and the mutual covenants hereinafter contained, the parties agree as follows:

1. Scope of Work

   Consultant agrees to participate in the capacity of Test Administrator as described in the Consortium proposal dated April 28, 1971 (St. Louis Minutes), and the Manual for Tests Development incorporated herein for reference.

2. Time of Performance

   The termination date of this Agreement shall be December 31, 1972.

3. Limitation of Cost

   Rutgers will reimburse the Consultant costs not to exceed $4,000.00 in accordance with the budget detail attached.

Consultant shall submit to Rutgers, at monthly intervals, request for reimbursement of expenditures incurred upon the submission of an invoice with appropriate supporting receipts and necessary documentation.

Consultant shall obtain prior approval from Rutgers for any alterations in the approved budget.

Equipment purchase shall not be an allowable cost to this Project.

4. Project Administration

Dr. C. Thomas Olivo is a Principal Investigator and Director of the Project. All requests for payment should be processed through Dr. C. Thomas Olivo at Plaza Seven Office Building, 1202 - Route 7, Latham, New York (12110).

5. Termination

The participation of services under this Agreement may be terminated by Rutgers for any reason that Rutgers or the Government under the General Provisions of the contract shall determine that such termination is in the best interest of the parties.

In witness whereof the parties hereto have executed this Agreement as of the day and year first written above.

Consultant

Rutgers University - The State University of New Jersey

By: _____

By: _____

Reference from St. Louis Minutes taken on April 28, 1971.

Guideline for Budget for Test Administration and Development
(Illustrative only)

1.	Test Administrator - 5 man days at $75.00	$ 375.00
2.	Test Examiners - 20 man days at $50.00	1000.00
3.	Secretarial Service	400.00
4.	Supplies, materials (estimated $5/examinee)	400.00
5.	Test Development - Planning Committee (3 man days)	225.00
	- Planning Committee Travel	225.00
6.	Test Writers - 21 man days	1050.00
7.	Communications, Phone, Postage	250.00
8.	Miscellaneous	75.00
	Total	$4000.00

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY EXAMINATION

****

• CLASSIFICATION OF PROJECT PARTICIPANTS

OCCUPATION	CLASSIFICATION										Total
	A	B	C	D	E	F	G	H	I	J	
1. Airframe and Power Plant		9	5	12	1	55				2	84
2. Airconditioning & Refrigeration		6	4	21	1	126				1	159
3. Auto Mechanic		4	3	24	1	140				2	174
4. Auto Body Repair		9	5	18	1	103				2	138
5. Architectural Drafting		7	6	18	1	174				2	208
6. Cabinet Making & Millwork		5	4	14	1	70				2	96
7. Carpentry		4	4	12	1	109				1	131
8. Cosmetology		7	19	16	1	96				2	141
9. Diesel Engine Repair & Maintenance		10	5	8	1	40				1	65
10. Electrical (Installation)		8	4	15	1	80				2	110
11. Electrical (Industrial)		4	3	15	1	81				2	106
12. Electronics (Communication)		5	5	16	1	86				3	116
13. Electronics (Industrial		4	3	9	1	56				2	75
14. Food Trades (Quantity Cooking)		9	4	15	1	92				1	122
15. Machine Trades		5	5	24	1	146				2	183
16. Machine Drafting		4	4	10	1	92				2	113
17. Masonry		4	4	4	1	34				2	99
18. Plumbing		3	4	8	1	47				1	64
19. Printing		4	3	10	1	57				1	76
20. Sheet Metal		3	4	10	1	72				1	91
21. Small Engine Repair		5	3	10	1	61				1	81
22. Welding		4	4	16	1	94				2	121
23. Mechanical Technology		6	3	13	1	64				2	89
24. Civil Technology		8	3	13	1	65				1	87
TOTAL	▼	137	111	348	24	2010	▼	▼	▼	40	2670
	8	X	X	X	X	X	44	4	1	X	57
						TOTAL					2727

A. Planning Committee
B. Advisory Committees
C. Test Item Writers
D. Performance Examiners
E. Area Test Coordinators
F. Candidates Tested
G. Consortium Representatives
H. Principal Investigators
I. Staff (1 full time, 1 part time)
J. Consultants

• TEN-STEP TEST DEVELOPMENT PROCEDURE

Test Development Procedure - A ten-step procedure has been developed which includes validation and reliability studies. It utilizes procedures generally known but not often applied in their totality.

1. Organization and utilization of an Advisory Committee, consisting of representatives from industry, occupational specialists, test specialists, and vocational teachers to establish the nature and scope of the examination to establish job clusters, as well as competency levels.

2. Selection and utilization of specialists from the field, test technicians and vocational teachers to make an analysis of the occupation to determine the behavioral and conceptual factors at each competency level.

3. Selection and utilization of specialists from the field, test technicians and vocational teachers to formulate a test specification, to develop a test grid for the areas to be tested and the number of questions needed for a comprehensive determination of an individual's occupational competence.

4. Employment of a group of subject specialists, under the guidance of a test specialist, to formulate the test questions and organize the tests.

5. Administration of the test to a recognized competent and knowledgeable individual in the occupational specialty.

6. Evaluation of the results, the test items, sequence, and test revision.

7. Evaluation of the revised tests by professional testing organizations (Psychological Corporation, New York; and the Educational Testing Service, Princeton, New Jersey; and others).

8. Administration of tests to candidates; results are tabulated, analyzed and, where necessary, items or distractors revised.

9. Validation of the revised tests by administering them to high school vocational program graduates, technical institute seniors, Industrial Arts graduates, and apprentices. The resulting data analyzed for validity, reliability and possible vocational norms.

10. Tests are printed for use.

• TEST PLANNING AND DEVELOPMENT COMMITTEES

ELECTRONICS INDUSTRY OCCUPATIONS

ELECTRONICS (COMMUNICATIONS)

Test Coordinator:

Dr. Adolf Panitz, Associate Director (NOCTP)

Advisory Committee:

Harold A. Hershey, Department Head
Machine Trades
City of Rochester School System
Rochester, New York

Dr. Robert Reese
Professor & Department Head
Teacher Education
Ohio

Peter Olive, Director of Personnel
Consultant Representing Industry
Hoffman Fuels (Standard Oil N.J.)
Connecticut

Irvin Tepper, Consultant & Editor
Electronics Magazine
Teacher of Electronics
New York City

Test Item Writers:

David Docteur, Specialist
Electronic-Communications Instructor
Adams, New York

F. McElroy, Instructor
Electronic Service, BOCES
Westbury, Long Island, New York

Neal Lash, Chairman
Department of Electronics
BOCES, Mineola, New York and
Industrial Consultant

I. Singer, Instructor
Electronic Service
New York City

William G. Lombard, Instructor
Communications Electronics
Syracuse, New York

Specialist for Overall Evaluation

Alfred J. Shaw
Electronics Consultant
Westbury, New York

Professional Testing Organization

Educational Testing Service
Dr. R. Johnson, Psychologist
and Test Specialist

Field Testing

Dr. Edward Roden, Consultant
Field Testing
State University of New York
Oswego, New York

Statistical Analysis

Dr. Thomas W. Mustico
Professor (Measurement)
State University of New York
Oswego, New York

MACHINE INDUSTRY OCCUPATIONS

MACHINE TRADES

Test Coordinator:

Dr. Adolf Panitz, Associate Director (NOCTP)
Testing and Machine Trades Specialist
New York

Advisory Committee:

Harold A. Hershey, Department Head
Machine Trades
City of Rochester School System
Rochester, New York

Dr. Robert Reese
Professor & Department Head
Teacher Education
Ohio

Peter Olivo, Director of Personnel
and Consultant Representing
Industry Hoffman Fuels (S.O.N.J.)
Connecticut

Irvin Tepper, Consultant & Editor
Electronics Magazine
Teacher of Electronics
New York City

Test Item Writers:

E. Bell, Teacher Machine Shop
Day & Evening Adult Program
Troy, New York

D. Meeker, Teacher
Machine Shop
Elmira, New York

Joseph Fuchs, Assistant Director
BOCES & Industrial Consultant
Albany, New York

H. Smith, Teacher Machine Shop
and Performance Test Examiner
New York State
Newburg, New York

Specialist for Overall Evaluation

Oscar Rath, Chairman
Voorhees Technical Institute
New York City
Consultant to Tool & Die Industry
New York

Professional Testing Organization

Psychological Corporation
Dr. W. Wallace, Psychologist
Director of Industrial
Testing Service

Field Testing

Dr. Edward Roden, Consultant
Field Testing
State University of New York
Oswego, New York

Statistical Analysis

Dr. Thomas W. Mustico
Professor (Measurement)
State University of New York
Oswego, New York

AUTOMOTIVE INDUSTRY OCCUPATIONS

AUTO BODY REPAIR

Test Coordinator:

Mr. William Wolansky
Industrial Education Building
Iowa State University
Ames, Iowa 50010

Assistant Coordinator:

Mr. Alvie Sarchett
Industrial Education Building
Iowa State University
Ames, Iowa 50010

Advisory Committee and Test Item Writers:

Mr. Jerry Bidler
Ankeny, Iowa 50021

Mr. William A. Hulle
Ames, Iowa 52804

Mr. Richard Ketterling
Davenport, Iowa 52801

Mr. Wayne Suiter
Sheldon, Iowa 51201

Mr. Gerald L. Timmerman
Davenport, Iowa 52804

Mr. Ronald Vant Hof
Hospers, Iowa 51238

Mr. Philip R. Yoder
Ankeny, Iowa 50021

AUTO MECHANICS

Test Coordinator:

Dr. David Allen, Coordinator
Division of Vocational Education
University of California - 1003 Wiltshire Boulevard
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Advisory Committee:

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APPENDIX F

SUPPORT FOR NATIONAL OCCUPATIONAL COMPETENCY TESTING PROGRAM

REPORT TO STATE DIRECTORS
OF VOCATIONAL EDUCATION

Columbus, Ohio - September 19, 1972

Presenters: Dr. Carl Schaefer
Principal Investigator and Meeting Chairman

Dr. C. Thomas Olivo
Project Director and Principal Investigator

Dr. Adolf Panitz
Project Associate Director

Purposes:

1. To report overall areas of accomplishment in National Occupational Competency Test Development, Use and Administration.

2. To solicit assistance in establishing an organizational framework to provide leadership and administrative capability in moving the Project from an experimental, demonstration base to a permanent operations unit.

WHAT HAS BEEN ACCOMPLISHED?

1. PUBLICATIONS:

   A. A Survey of the "STATE-OF-THE-ART OF OCCUPATIONAL COMPETENCY TESTING" secured, reviewed, assessed present practices and established a reference point for the Project.

   B. A "HANDBOOK FOR DEVELOPING AND ADMINISTERING OCCUPATIONAL COMPETENCY TESTS"

      This is the only practical "How To Do Manual" for test development procedures, item development and organization now available.

   C. "DIRECTIONS FOR: AREA TEST CENTER COORDINATION,
      TEST DEVELOPMENT,
      TEST ADMINISTRATION"

      Specific procedures for Test Coordinators, Test Developers and Test Administrators.

II. TWENTY-FOUR TESTS FOR MAJOR OCCUPATIONAL AREAS HAVE BEEN DEVELOPED

Written and Performance Tests (Forms A and B) have been developed in the following Major Occupational Areas:

MAJOR AREAS	OCCUPATIONS
Automotive Industry Occupations	- Auto Mechanics - Auto Body Repair - Diesel Engine Repair and Maintenance - Small Engine Repair
Aviation Industry Occupations	- Aircraft Mechanic - Engine
Building Industry Occupations	- Airconditioning and Refrigeration - Carpentry - Electrical (Installation) - Masonry - Plumbing - Sheet Metal
Drafting Industry Occupations	- Architectural Drafting - Machine Drafting
Electrical Industry Occupations	- Electrician (Industrial)
Electronics Industry Occupations	- Electronics (Communications) - Electronics (Industrial)
Food Industry Occupations	- Quantity Food Preparation
Graphic Arts Industry Occupations	- Printing
Industrial/Technical Occupations	- Civil Technology - Mechanical Technology
Machine Industry Occupations	- Machine Trades
Metal Industry Occupations	- Welding
Personal Service Industry Occupations	- Cosmetology
Wood Industry Occupations	- Cabinet Making and Millwork

III. MATERIALS DEVELOPED FOR EACH TEST

A. Listing of Job Clusters and Determination of Job Cluster Levels for each major occupation

B. Analysis of Job Clusters showing manipulative skills, procedures, methods and occupational-related information that constitute competency at the journeyman's level or its equivalent.

C. Determination of Examination Content Grid

D. Information for the Candidate -

The scope of the examination for the written and performance parts

E. Written Test (Forms A and B), including Answer Sheet and Answer Key

F. Performance Test (Forms A and B)

G. Directions to the Examiner -

1. Listing of tools, machines and materials required for both forms of the performance test

2. Performance Evaluation Form for each candidate

IV. ORGANIZATIONAL ACTIVITIES

A. First meeting of States' Representatives, Chicago, Illinois, March 1970 - 32 states participated

B. Second meeting of States' Representatives, St. Louis, Missouri, April 12-14, 1971. Designated States' Representatives of interested states increased to 44

C. Meeting of Pilot Area Test Coordinators

D. Numerous meetings with test developers in the field

V. FIELD TESTING OF TESTS

A. All of the following eleven tests have been pilot tested in each of the following states:

MAJOR AREA	OCCUPATION
Automotive Industry Occupations	- Auto Mechanic - Diesel Engine Repair and Maintenance
Building Industry Occupations	- Carpentry - Masonry
Drafting Industry Occupations	- Machine Drafting
Electronic Industry Occupations	- Electronics (Communications) - Electronics (Industrial)
Graphic Arts Industry Occupations	- Printing
Machine Industry Occupations	- Machine Trades
Metal Industry Occupations	- Welding
Personal Service Industry Occupations	- Cosmetology

STATES

California	Ohio
Colorado	South Dakota
Georgia	Tennessee
New Jersey	Wisconsin
New York	

B. Each of the following thirteen tests are in the process of being field tested:

MAJOR AREA	OCCUPATION
Automotive Industry Occupations	- Auto Body - Small Engine Repair
Aviation Industry Occupations	- Airplane Mechanic
Building Industry Occupations	- Airconditioning and Refrigeration - Electrical (Installation) - Plumbing - Sheet Metal
Drafting Industry Occupations	- Architectural Drafting
Electrical Industry Occupations	- Electrical (Industrial)
Food Industry Occupations	- Quantity Food Cooking
Industrial/Technical Occupations	- Civil Technology - Mechanical Technology
Wood Industry Occupations	- Cabinet Making and Millwork

STATES

Connecticut	Michigan
Florida	Minnesota
Hawaii	Montana
Illinois	New Mexico
Iowa	Oklahoma
Kentucky	Vermont
Massachusetts	Virginia
	Washington

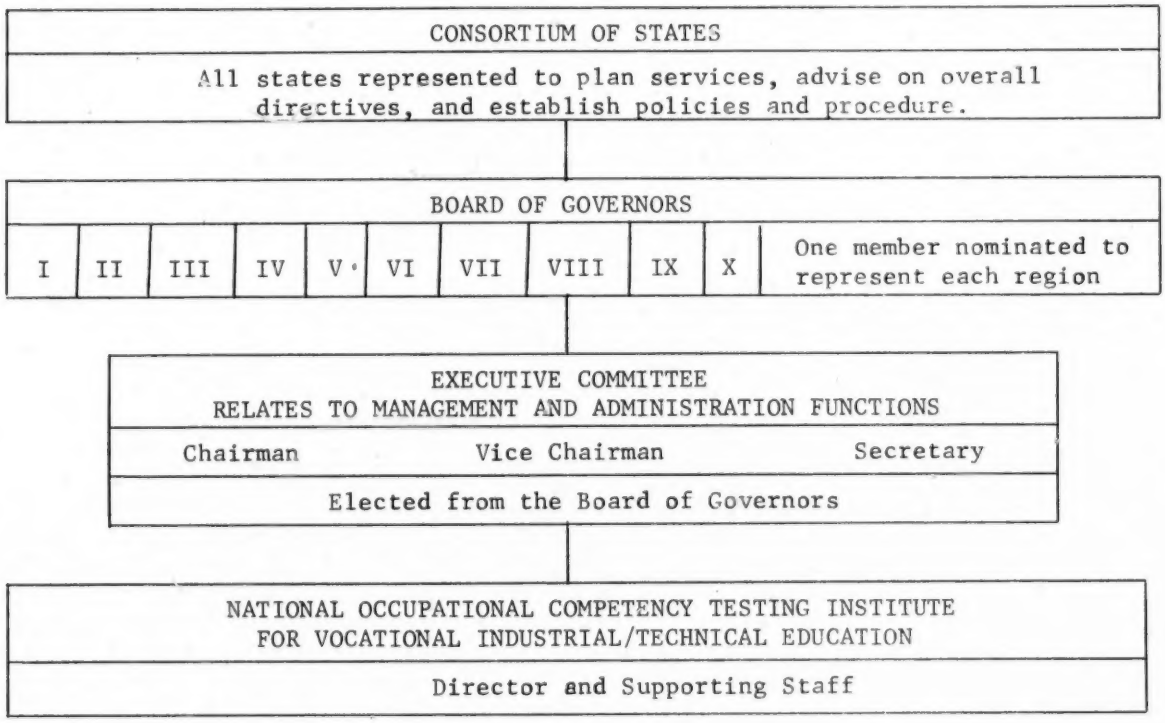
HOW SHOULD THE CONSORTIUM BE STRUCTURED?

The continuation of the Project depends upon the extent to which the states will assume financial support.

Administrative Framework

The following administrative pattern is suggested:

The Governing Committee to consist of individuals in decision-making positions supported by a Consortium Group of States Representatives.



• ESTIMATES OF NEEDED STATE FINANCIAL SUPPORT

ALTERNATIVE 1 : FUNDING OF NATIONAL OCCUPATIONAL COMPETENCY TESTING PROGRAM AND SERVICES THROUGH A CONSORTIUM OF STATES

The rationale for determining the contribution of the individual states that comprise the National Occupational Competency Testing Consortium is the same as that used in determining the amount received by those states in FY 1969 in the "Basic Grants provision of the 1968 Vocational Education Amendments".

This formula reflects the criteria of P.L. 90-576, Title I, Part A, Sec. 103(d) based upon size of population, per capita income, etc., and is stated as follows:

$$ISC = \frac{(BG)\ \ (PDAC)}{B}$$

Where:

ISC = Individual State Contribution in dollars

BG = Basic Grant - received by the state in 1969, under PL 90-576

PDAC = Project Development Administration Cost

B = Base figure = sum of the basic grants of the 33 participating states = $158,419,170

Example: Assume there is a representative governing body formed by the Consortium organization. This body, with the approval of the Consortium members, approves project development and costs estimated at $150,000 per year. Using New Jersey as an example, Table I shows that it received $6,497,533 under the basic grant provisions for FY 1969. The state's contribution to the Consortium is, therefore:

$$ICS_{(nj)} = \frac{6,497,533 \times 100,000}{158,419,170} = \$4,101$$

Naturally, the Base (B) will ultimately be determined by the number of states participating in the Consortium; the more states, the less the cost to the individual state. However, certain states, because of legislative restrictions upon external contractual commitments, cannot participate directly; they can only agree to the purchase of individual tests. As long as they commit to the purchase of a sufficient number of tests at a price, which incorporates that state's share of the development and administration costs, they will be considered as a member of the original Consortium, and the Base will include that state's share of the composite Basic Grant figure.

Let's assume the cost per test to the regular Consortium member is $50. Next, let's assume that a major state such as California cannot commit funds by apportioning its state grant. Calculated upon the aforementioned base, California's share of the development and administration cost is $11,459, but it can't pay this sum for development and administration purposes. However, it does need 1000 tests and has discretionary authority on the amount it may pay for them. The total cost to California for these 1000 tests would then be $61,459 ($50,000 + $11,459) or $61.46 per test. On all subsequent orders over the original 1000, the per test cost would be reduced to $50 -- the same price the rest of the Consortium pays.

Any state that is not a part of the original Consortium, but desires to enter into it, will be assessed according to the original formula and Base. The express funds thus derived will be used to develop and administer additional competency tests and to maintain the original tests current. Such states will either be assessed their share of the development and administration costs, as if they had been a member of the original Consortium, or else may purchase tests at a fee of $65 each test until their obligation has been liquidated.

This alternative is subject to review by all states and acceptance of the final provisions would be made by the individual states.

BASIC GRANTS TO STATES AND PROJECT FUNDING

	Basic Grants to States 1969	Funding by Consortium States *	Funding by Non-Consortium States
Alabama	5,493,553		3,468
Alaska	293,153		185
Arizona	2,237,119	1,412	
Arkansas	2,963,572		1,871
California	18,153,766	11,459	
Colorado	2,410,681	1,522	
Connecticut	2,613,726	1,650	
Delaware	478,774	302	
D.C.	650,227	410	
Florida	7,393,929		4,667
Georgia	6,961,237		4,394
Hawaii	943,321		595
Idaho	1,032,903		652
Illinois	9,870,472	6,231	
Indiana	5,660,581	3,573	
Iowa	3,309,767	2,089	
Kansas	2,789,750	1,761	
Kentucky	4,894,998		3,090
Louisiana	5,488,273		3,464
Maine	1,387,705	876	
Maryland	4,025,023	2,541	
Massachusetts	5,409,065		3,414
Michigan	9,105,044	5,747	

	Basic Grants to States 1969	Funding by Consortium States *	Funding by Non-Consortium States
Minnesota	4,346,673		2,744
Mississippi	3,755,696	2,371	
Missouri	5,453,944		3,443
Montana	971,393		613
Nebraska	1,742,754	1,100	
Nevada	390,324	246	
New Hampshire	834,902	527	
New Jersey	6,497,533	4,101	
New Mexico	1,524,933		963
New York	16,331,918	10,309	
North Carolina	7,956,680	5,023	
North Dakota	975,062		615
Ohio	11,817,532	7,560	
Oklahoma	3,531,214		2,229
Oregon	2,410,600	1,522	
Pennsylvania	13,347,672		8,426
Rhode Island	1,031,291	651	
South Carolina	4,356,478	2,750	
South Dakota	978,137	617	
Tennessee	5,843,004	3,688	
Texas	15,170,553	9,576	
Utah	1,445,921	913	
Vermont	563,453	356	
Virginia	6,456,132	4,075	
Washington	3,519,602		2,222
West Virginia	2,836,702	1,791	
Wisconsin	4,890,133	3,087	
Wyoming	416,792	263	
American Samoa	47,465		30
Guam	147,807		93
Puerto Rico	4,122,310		2,602
Virgin Islands	83,706		53
Trust Territory of the Pacific	132,500		84
		100,098	49,917

* The states included as "Consortium States" represent the participants at the March 1970 project meeting who expressed an interest in forming such a body. They are included for illustrative purposes only as no formal approval has been given or commitments made.

• SOLICITATION OF CONSORTIUM REPRESENTATIVE SUPPORT

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
Plaza Seven Office Building 1202 - Rt. 7, Latham, New York

November 1, 1972

TO CONSORTIUM REPRESENTATIVES

Dear _____:

Decisive action is needed for the National Occupational Competency Testing Project to become operational early in 1973. As the person who was designated to serve your State in the formation of the Consortium, your help is solicited to accomplish three tasks:

1. Establish an Institute as the vehicle to carry on the Consortium activities;

2. Organize an administrative unit and policy-making Governing Board; and

3. Declare your State's intent.

A Memorandum of Intent is attached. As you know, the Project terminates on December 21, 1972. Continuation of the program and services depends on the collective support of the Consortium members. Our twenty-four field-tested examinations will be the nucleous of the testing program. Additional examinations and services will be provided, depending on Consortium support.

As your State's representative on the Consortium, please carry out three specific responsibilities:

1. Discuss with your State Director the importance of this letter, the Memorandum of Intent, and the cost sheet which shows how the State's dollar support was prorated. Emphasize that in the future test costs will be determined by the policy-making body (which will include State Director representation).

2. Determine which of the suggested alternatives for participation by your State is acceptable. Or, suggest modifications for consideration.

3. Return the signed Memorandum of Intent to me at the above Project address by November 20.

The Consortium represents a pooling of State resources in a common undertaking. The Consortium program is established to provide services which fulfill each State member's needs at an equally shared cost.

Thank you for recognizing the urgency of this request and for acting promptly to ensure your State's support.

Sincerely,

Carl J. Schaefer for:
C. Thomas Olivo
Melvin Barlow
Richard Nelson

Enc.: Memorandum of Intent
Cost by State

• SUGGESTED MEMORANDUM OF INTENT TO PARTICIPATE IN THE NATIONAL OCCUPATIONAL COMPETENCY TESTING CONSORTIUM

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
Plaza Seven Office Building 1202 - Route 7
Latham, New York (12110)

_____
(State)

The period covered by this understanding is from July 1, 1973 through June 30, 1974. In support of the Consortium, the following conditions are understood:

1. The National Occupational Competency Testing Project will become operational on July 1, 1973. It will serve the functions as determined by the collective action of the Consortium members in 1972. For the fiscal year 1973, the program will provide services which relate to the twenty-four occupational competency tests in the National Project.

2. A Governing Board will serve as the policy-making body and the administrative unit. Representatives of the State Directors will serve on the Governing Board as determined by the National Association of State Directors of Vocational Education.

3. The state agrees to support the program by:

   (a) Participating according to guides which safeguard the integrity of the program and the total national effort as earlier defined by the State Representatives to the Consortium, and either conditions (b), (c) or (d).

   (b) Providing $ _____ which represents the State's pro rata share. For this sum the State will receive all services relating to the administration of, at least, _____ tests. Additional tests will be available at a reduced cost. Or,

   (c) Purchasing _____ tests at a cost of $65.00 per test (which includes development, test administration, scoring and reporting test results). Additional tests will be available at a reduced cost. Or,

(d) State other conditions under which your State may participate.

NOTE: The dollar amounts for each State are based on a minimum percent of the Basic State Grant for Vocational Education for 1969. The number of tests was obtained by dividing this sum by the current estimated cost per test.

4. States who are unable to sign a Memorandum of Intent but who declare that the National Occupational Competency Tests will be used for purposes and conditions established by the Consortium may, during fiscal year 1973, purchase a minimum number of tests at the stated cost of $65.00 per test. However, such States have no guarantee that candidates to be tested will be served in a Test Center in their area, unless such participation benefits the Consortium members.

It is the intent of this State to participate in the National Occupational Competency Testing Consortium as hereinbefore stated.

_____ _____

State Director Date

_____ _____

For the Consortium Date

APPENDIX G

PROPOSAL FOR PROJECT CONTINUATION

- REQUEST FOR PROPOSAL FOR ORGANIZING AND OPERATING A NATIONAL OCCUPATIONAL COMPETENCY TESTING CENTER

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

Plaza Seven Office Building 1202 Route 7
Latham, N. Y. 12110 Phone (518) 785-1524

Dr. C. Thomas Olivo
Director

Dr. Adolph Panitz
Associate Director

I. INTRODUCTION

The continuing expansion of vocational trade, industrial/technical education requires the selection and development of significant numbers of teachers with demonstrated occupational competence. Thus, objective measures are urgently needed to validate both the skill and technical competency of the prospective teacher.

The National Occupational Competency Testing Project was established through a grant from the Bureau of Research, United States Office of Education, totaling approximately $300,000 for a three-year period, at Rutgers University.

Through a national effort, forty-four states have designated representatives to a National Occupational Competency Testing Consortium which has served to develop guidelines and provide support for the program.

II. ASSETS AND RESOURCES

The efforts of the Project Staff have resulted in the following tangible assets:

A. A first national survey of "The State of the Art of Occupational Competency Testing"

B. A comprehensive "Handbook for the Developing and Administering Occupational Competency Tests"

C. Written and performance tests with alternate forms have been completed in the following twenty-four Major Industrial Occupations:

Aircraft Industry Occupations
- Aircraft Mechanic-Engine

Automotive Industry Occupations
- Auto Mechanics
- Auto Body Mechanics
- Diesel Engine Repair and Maintenance
- Small Engine Repair

Principal Investigators

Dr. Carl Schaefer
Rutgers University, New Jersey

Dr. Melvin Barlow
University of California, Los Angeles

Dr. Richard Nelson
State Department of Education, Sacramento

"Consortium for Occupational Competency Testing of Trade and Industrial/Technical Teachers." Research Project Grant 8-0474, Bureau of Research, United States Office of Education to the Graduate School of Education, Rutgers University.

Building Industry Occupations	- Air Conditioning
	- Carpentry
	- Electrical Installation
	- Masonry
	- Plumbing
	- Sheet Metal
Drafting Industry Occupations	- Architectural Drafting
	- Machine Drafting
Electrical Industry Occupations	- Electrician (Industrial)
Electronics Industry Occupations	- Electronics (Communications)
	- Electronics (Industrial)
Food Industry Occupations	- Quantity Food Preparation
Graphic Arts Industry Occupations	- Printing
Industrial/Technical Occupations	- Civil Technology
	- Mechanical Technology
Machine Industry Occupations	- Machine Trades
Metal Industry Occupations	- Welding
Personal Service Industry Occupations	- Cosmetology
Wood Industry Occupations	- Cabinet Making and Millwork

D. Pilot Area Test Centers - Twenty-four Pilot Area Test Centers have been established in geographically located states, so that other adjacent states can participate in pilot testing the tests.

E. Personnel Involved - Twenty-four Pilot Area Test Coordinators have been designated to develop a test and coordinate the administration of their own and nine other tests.

One hundred forty-four individuals have served on planning committees which established job clusters and the scope of the examination.

About one hundred individuals have served as Test Item Writers and developed performance tests.

Forty-eight individuals served as Examiners to evaluate the performance part of the examination.

Sixteen individuals administered and proctored the written part of the examination.

F. Number of Candidates - The written and performance parts, Form A of the examinations, have been administered to about 420 candidates.

G. Test Evaluation - The tests have been reproduced, distributed and are statistically evaluated - item analysis, reliability - validity, standard deviation and other evaluative criteria - and are in the process of revision.

III. DESIRED OPERATIONAL COMMITMENT

The results of the three-year national effort have created the need for a permanent National Center for Occupational Competency Testing. It is highly desirable that such a Center function as part of a well-organized testing organization. Consideration for the continuation of the Project by such an organization will be based upon the following:

A. Recognition of and cooperation with a Governing Board, elected by the Consortium of States, which establishes guidelines and directional policies,

B. Establishment of a permanent office including secretarial and supportive staff,

C. Appointment of a director in conformance with Governing Board recommendation,

D. Assumption of the duplication, distribution, scoring, and reporting of results of current examinations,

E. Further refinement of current examinations, including statistical evaluation; i.e., reliability, validity, norms, and others,

F. Development, evaluation and administration of new examinations in accordance with policies established by the Governing Board,

G. The expansion of Test Centers in additional states, including the extension of training Examiners and Coordinators,

H. Providing facilities for and arrange meetings with the Governing Board, at least, twice yearly,

I. Arrange and facilitate in cooperation with the Project Staff, at least, one Consortium Meeting, preferably, at the location and time of the A.V.A. Convention,

J. Determine, in cooperation with the Governing Board and the Project Staff, a range of charges for the examinations for active Consortium members and non-members,

K. Establish, in cooperation with the Governing Board and Project Staff, working procedures covering the availability of and access to the examinations by Consortium and Non-Consortium states or institutions,

L. Set up, in cooperation with the Governing Board and the Director, resources for the continuation.

IV. IN CONSIDERATION

In consideration for the above services and efforts, the Consortium of States will assure a gross volume of business of $ 50,000 for a period of three years. An operating budget will be based on prorated charges to the member states of the Consortium. Consortium members will receive in return, without charge, a number of examinations not to exceed in value their contribution. For additional examinations, there will be an additional charge.

States or institutions, not members of the Consortium, may purchase examinations and the attending service at a higher rate than that charged Consortium members.

V. AWARDING OF CONTRACT

Organizations interested in being considered for designation as the National Center for Occupational Competency Testing should respond in terms of the "Desired Operational Commitment" of the Request for Proposal and send their proposal to:

Dr. Adolf Panitz, Associate Director
National Occupational Competency Testing Project
Plaza Seven Office Building, 1202 - Rt. 7
Latham, New York 12110

A final decision will be made sometime in late September or early October, 1972. Meanwhile, further questions and clarifications are encouraged.

• SUGGESTED GUIDELINES FOR ASSESSING N.O.C.T. INSTITUTE PROPOSALS

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
EXECUTIVE COUNCIL (Meeting #1)

Assessment Scale of Capability and Potential (4) Maximum level (performance, capability, experience) (3) Intermediate level (good potential for growth toward maximum level) (2) Minimum acceptable level (1) Inferior level; unacceptable NOTE: Any proposal scoring below the 2.5 level (averaged overall criteria) should be rejected	ORGANIZATION PROPOSALS					
CRITERIA	Educational Testing Service	Psychological Corporation	Vocational Research Center	Instructional Materials Laboratory	Dunwoody Industrial Institute	East Michigan University
A. Proposal compatible with purposes of NOCT Institute						
B. Organization readily accepted by trades and industrial/technical educators						
C. Capability of providing leadership function in occupational competency testing services						
D. Financial capability to establish the Institute						
E. Capability to maintain the NOCT Project program and services during a 2-3 year transition period						
F. Proposed personnel and material resources are adequate to provide all services of the NOCT Project						
G. The organization shows a management structure geared toward growth and development of the NOCT Institute for Trades and Industries						

CRITERIA	ORGANIZATION PROPOSALS					
	Educational Testing Service	Psychological Corporation	Vocational Research Center	Instructional Materials Laboratory	Dunwoody Industrial Institute	East Michigan University
H. The organizational hierarchical structure and management is condusive to ease in decision making and early implementation (action)						
I. The organization is depending upon external financing, thus limiting the future of the NOCT Project						
J. The organization has practical experience in trade-industrial/ technical occupational competency testing, including all functions performed by NOCT Project						
K. The organization has the ability and resources to enlist professional services and support from trades-industrial/technical educators to serve as Area Test Center Coordinators, Examiners, Test Developers, etc.						
L. Provisions are made and safeguards are provided for the Executive Council, the Administrative Board and the NOCT Consortium to establish and control selected management functions						
M. The organization provides continuing opportunities for trades and industrial/technical educators to guide and further develop programs and services as related to current functions and extensions to new and related services						

ORGANIZATION RECOMMENDED

SUPPORTIVE COMMENTS

By: _____

February 21/22, 1973

A P P E N D I X H

FIELD TESTING OCCUPATIONAL COMPETENCY TESTS

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
Plaza Seven Office Building 1202 - Route 7
Latham, New York (12110)

March 1, 1972

TO: State Representatives to the Consortium for the National Occupational Competency Testing Project

SUBJECT: Important Field Testing - Occupational Competency Tests

Ten occupational competency tests are now available to be field tested. Thus, tangible services may be provided to the states. Eight National Occupational Competency Test Centers have participated in this phase of the Project in the development of the tests, both theory (written) and performance (practical). These tests have undergone preliminary trials to establish internal validity.

Separate schedules are attached for each test. Note the times, locations, and (particularly) the conditions under which each Center will administer the examinations. To expedite the services, information is included on the forms for only those Test Centers that have reported to date. A similar packet of materials/information will be furnished you in 15 days on the schedule for the remaining Test Centers.

This Office is now developing a schedule from which arrangements will be made to administer each examination to all or a percent of the trade and industrial teacher candidates whom you identify. Your input is needed to provide certain information as follows:

1. Indicate the number of candidates whom you certify as qualifying to take each examination (on the appropriate form). Note the Test Center location where the candidates will take both the written and performance tests;

2. Append a list of eligible candidates by trade or industries area;

3. Return the forms via Airmail so this information reaches this Office by or before March 24. If you have no trade and industrial candidates to be tested in the first occupational areas, it is important that we be so advised.

On March 24, a composite schedule will be prepared.

1. Each State Representative will be advised if all or a pro rata number of candidates can be accommodated in this field testing phase.

2. The Test Administrator of the Center will be provided with the composite schedule and a list of your qualified candidates.

3. The National Occupational Competency Testing Project Reproduction/Distribution Institute will simultaneously be authorized to furnish the Test Administrator of each Center with the required number of theory and practical tests.

4. Thereafter, you, as the State Representative, will be dealing directly with the concerned Test Administrator of the Center.

5. The tests will be returned by the Test Administrator of each Center to the National Occupational Competency Testing Project Institute for scoring and analysis.

6. Printouts of part and total scores and scores by item groups will be sent to each State Representative for that state's candidates only.

7. Composite statistical data for comparative purposes (without candidate identification) will be provided at a later date to each of the State Representatives.

Immediate feedback is needed from you. Prompt response and cooperation is essential to the success of the Project and to provide these essential services to each of the states.

Thank you.

Cordially,

Adolf Panitz
Co-Director

AP:mo

Attachments:
Schedules for test administration

cc: Principal Investigators
Planning Committee
Test Administrators
NOCT Project Institute (Ohio)

• ELIGIBLE CANDIDATES IDENTIFIED BY STATE REPRESENTATIVES TO THE CONSORTIUM

March 17, 1972

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY EXAMINATIONS AUTOMOTIVE INDUSTRY OCCUPATIONS (AUTO MECHANICS)

Dates	Time	Area Test Center	Test Administrator	Conditions	* No. of Eligible Candidates
April 7	1:30 PM to 4:30 PM	(Theory) - Room 113 Technical Center Bldg. University of So. Dakota at Springfield Springfield, So. Dakota 57062	Dr. Thomas C. Stone, Dir. of Technical Studies University of So. Dakota at Springfield Springfield, So. Dakota 57062	Examinees may use test results as basis for receiving college credits applicable to a degree in Vocational Teacher Education.	
April 8	8:00 AM to 4:30 PM	(Practical) - AM Lab Automotive Building (Same as above)	Office Phone: 605-369-2991 (Same as above)	(Same as above)	
April 28	8:00 AM to 11:00 AM	(Theory) - Conference Room Knoxville State Area Vocational Technical School 1100 Liberty Street Knoxville, Tennessee 37919	Dr. Donald D. Riggs Assistant Professor Industrial Education Dept. 16 Claxton Education Bldg. The University of Tennessee Knoxville, Tennessee 37916	1972 Field Test (no charge) unless University of Tennessee Credit is requested. A charge of $30 for 27 quarter hours of credit (in-state or out-of state).	
April 28	12:00 N to 5:00 PM	(Practical) - Auto Shop (Same as above)	Office Phone: 615-974-3276 (Same as above)	(Same as above)	
May 5	7:00 PM to 10:00 PM	(Theory) - Auto Classroom Troup County Area Vocational School LaGrange, Georgia	Dr. Don L. Karr Assistant Professor 213 Fain Hall University of Georgia Athens, Georgia 30601	25 Quarter Credits - University of Georgia Undergraduates only. Test Fee $50.00.	
May 6	9:00 AM to 2:00 PM	(Practical) - Automotive Classroom (Same as above)	Office Phone: 404-542-3211 (Same as above)	(Same as above)	

*The State Consortium Representatives are requested to furnish the names of eligible candidates for the number indicated who will be available to take this examination on the dates and at the locations indicated.

• PHASE III FIELD TESTING NOTICE

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

Plaza Seven Office Building 1202 Route 7
Latham, N. Y. 12110 Phone (518) 785-1524

Dr. C. Thomas Olivo
Director

Dr. Adolph Panitz
Associate Director

April 3, 1973

TO: State Representatives to the Consortium for the National Occupational Competency Testing Project

SUBJECT: Field Testing Schedule - Phase III
Thirteen Occupational Competency Tests

FROM: Dr. Adolf Panitz, Associate Director

Thirteen new occupational competency tests, developed during Phase III of the Project, are now available for field testing. Thus, added services may be provided to the states. Thirteen National Occupational Competency Test Centers have participated in the development of these tests, both written (theory) and performance (practical). These tests have undergone preliminary trials to establish their validity.

Separate schedules are attached for each test. Note the times, locations of each Center and the conditions for taking the tests. The Test Centers have reported the dates and places where each examination will be conducted.

<u>This pilot-testing program provides an opportunity for states adjacent to the Test Centers to have eligible candidates take the tests.</u>

Your cooperation is requested to identify eligible candidates who live within reasonable travel distance to the various Centers and are interested to take the competency examination in their respective occupation.

In this second pilot program you may deal directly with the concerned Test Administrator. He has been authorized to admit to the examination, space permitting, candidates from other states.

The completed tests will be returned by the Test Administrator to the National Occupational Competency Testing Project Institute for scoring and analysis. Print-outs of part and total scores, and scores by item groups will be sent to each State Representative for the candidates from his state.

Principal Investigators

Dr. Carl Schaefer
Rutgers University, New Jersey

Dr. Melvin Barlow
University of California, Los Angeles

Dr. Richard Nelson
State Department of Education, Sacramento

Composite statistical data for comparative purposes, without candidate identification, will be provided at a later date for each of the State Representatives.

Prompt response and cooperation is essential to provide these services to each of the states.

Attachments:
Schedules for test administration

"Consortium for Occupational Competency Testing of Trade and Industrial/Technical Teachers." Research Project Grant 8-9474, Bureau of Research, United States Office of Education to the Graduate School of Education, Rutgers University.

• FIELD TESTING SCHEDULE - PHASE III

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY EXAMINATIONS - BUILDING INDUSTRY OCCUPATIONS
AIRCONDITIONING AND REFRIGERATION

Date	Time	Area Test Center	Test Administrator	Conditions
1973 March 24	8:00 AM to 12:00 N	(Written) - Cafeteria Pinellas Vocational-Technical Center Clearwater, Florida	Dr. James W. Selman Associate Professor College of Education University of So. Florida Tampa, Florida (33620) Phone: (813) 974-2100	45 quarter hours credits at University of South Florida; cost includes materials, supplies, custodial & Test Administrator services; total cost equally distributed among participants.
March 24	1:00 PM to --	(Performance) Air Conditioning Lab (same as above)		
April 1		Ohio (contact Test Administrator)	Contact: Mr. Ray E. Rinderer Instructional Materials Lab The Ohio State University 1885 Neil Avenue -Dept 1240 Columbus, Ohio (43210) Phone: (614) 422-5001	
April 6	10:00 AM to 5:00 PM	(Written) Oklahoma State Tech. Okmulgee, Oklahoma	Mr. Doyle Butler Dept. Trade & Industrial Education Oklahoma State University 104 Industrial Building Stillwater, Oklahoma(74075) Phone: (405) 372-6211	May take for college credit if desired and qualified to do so.
April 6	10:00 AM to 5:00 PM	(Performance) (same as above)		

The State Consortium Representatives are requested to furnish the names of eligible candidates available to take this examination on the dates and at locations indicated to the Pilot Area Test Administrator.

Date	Time	Area Test Center	Test Administrator	Conditions
1973 April 11-13		(Written)	Mr. Myron N. Corman Rutgers University College Dept. Urban Education 12 College Ave.- Rear Bldg. New Brunswick, New Jersey (08903) Phone: (201) 247-1766	
April 14		(Performance) Contact Test Administrator		
April 16	1:00 PM to 5:00 PM	(Written)- Room 14-15 Rankin Student Center Ferris State College Big Rapids, Michigan 49307	Dr. George Storm School of Education Ferris State College Big Rapids, Michigan 49307 Phone: (616) 796-9971 Ext. 588	$75 fee to cover expenses. Reservations to take exam must be made 10 days prior to exam day.
April 17	8:00 AM to 5:00 PM	(Performance) T & I Annex - Room 106 Ferris State College Big Rapids, Michigan 49307		
April 19	5:00 PM to 7:00 PM	(Written) Cabell County Career Center - Rm. 240 2800-2850 Fifth Avenue Huntington, W. Virginia (25702)	Dr. Thomas R. Allen, Jr. Assistant Professor Dept. Vocational-Technical Education Marshall University Huntington, W. Virginia Phone: (304) 696-3630	No special conditions.
April 19	7:00 PM to 10:00 PM	(Performance) (same as above)		
April 27	1:00 PM to 5:00 PM	(Written) ETIA Bldg.-Rm 210 Northern Montana College Havre, Montana (59501)	Mr. Thad E. Diebel, Dean Vocational-Technical Div. Northern Montana College Havre, Montana (59501) Phone: (406) 265-7821 Ext. 236	Participant to be charged for consumable supplies. Up to 60 credits toward Bachelor's Degree from Northern Montana College. (see Administrator for details)
April 28	8:00 AM to 12:00 N	(Performance) ETIA Building/ Modern Refrigeration (same as above)		

• SCOPE OF THE WRITTEN AND PERFORMANCE EXAMINATION FOR MACHINE TRADES

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY EXAMINATION

DIRECTIONS TO THE CANDIDATE

Occupational competency examinations are used, in conjunction with other criteria, for a single or for a combination of purposes:

1. Admission to trade and industrial/technical teacher education programs

2. To meet state requirements for certification

3. To establish evidence of occupational competence for advanced standing in undergraduate or graduate programs of study

They are designed to test the level of skill and knowledge of the candidate in his particular occupational field, as compared to other experienced people in the same occupation.

Two types of examinations are administered.. The WRITTEN examination, consisting of multiple-choice questions, covers the information, knowledge and judgements a competent tradesman is expected to apply to his work.

The PERFORMANCE examination includes a variety of typical tasks a competent tradesman is expected to be able to perform.

The Scope of each examination (shown below) lists the areas included in the examination and the proportion of questions from each area.

WRITTEN EXAMINATION

1. Candidates may take three hours to complete the written examination.

2. They will be notified as to the date, time and place of the examination.

3. A #2 Lead pencil must be provided by each candidate.

I. SCOPE OF THE WRITTEN EXAMINATION

A. Trade information, theory, facts and basic principles the applicant should know

1. Bench & Assembly Work, Layout & Inspection (percent of the exam 12%)

a) Principles and procedures of layout work
b) Interpretation of blueprints, drawings-sketches
c) Principles of inspection and precision measurement
d) Utilization of precision tools and measuring instruments
e) Determination of tolerances, specifications from drawings for proper sequence of operations-treatment of materials
f) Hand tool, assembly and bench operations and utilization of proper tools

2. Machine Sawing, Filing & Multiple Parts Processing (3%)

a) Principles of operations
b) Special functions - filing - internal & external
c) Cutting tools, blades - friction cutting
d) Selection of blades, file chains, etc.
e) Determination of feeds and speeds

3. Drilling, Tapping, Lapping - (Machines & Attachments) (5%)

a) Sizes and capacities of machines and attachments
b) Single spindle and multiple spindle production operations
c) Principles of precision finishing - reaming - lapping
d) Determination of tolerances and internal finishes
e) Principles and methods of clamping work
f) Determination of speeds and feeds
g) Determination of sizes and kinds of drilling and tapping tools

4. Electrical Discharge Machining (4%)

a) Principles of operation of electronic machining
b) Operation and adjustment of controls
c) Determination of limits and tolerances from blueprints and specifications
d) Accuracy, tooling, size

5. Grinding & Precision Finishing - Processes & Machines (17%)

a) Types and kinds of machines and equipment
b) Principles of operations - form and crush grinding
c) Principles of clamping methods
d) Identification and selection of abrasive wheels
e) Kinds and types of finishes
f) Principles of tool & cutter grinding

6. Materials Treatment, Identification and Testing (5%)

a) Characteristics of materials commonly used in the trades (ferrous - nonferrous materials)
b) Machining characteristics (how to identify)
c) Identification of sizes, specifications and grades of materials
d) Heat treatment methods (hardening, tempering, annealing, carburizing, surface and spot hardening)
e) Special heat treating methods (induction - atmosphere control)
f) Hardness testing methods and instruments
g) Cooling methods - water, oil, air

7. Turning Processes & Machines (17%)

a) Types & kinds of machines (engine lathes, turret lathes, automatic machines
b) Speeds & feeds (adjustments & calculations)
c) Clamping devices (mechanical - pneumatic chucks, collets turn and face plates)
d) Calculations for tapers, angles, thread turning
e) Accessories - taper attachments - steady & follower test
f) Tools and instruments for single or multiple operation
g) Methods of internal and external turning - single edge - box tools
h) Production of single or multiple pieces
i) Principles of turret and automatic turning

8. Milling Processes and Machines (17%)

a) Types, kinds and capacities of machines
b) Principles of operation (down and climb milling)
c) Accessories and special equipment (vert heads, dividing-heads, turntables - application and principle of operation)
d) Principles and methods of clamping regular and odd shapes

e) Types, sizes and selection of milling tools
f) Calculation of feeds, speeds for various materials
g) Principles of mechanical or optical contour milling
h) Determination of milling finishes from blueprints and specifications

9. Electrically Controlled Machine Processes (N/C) (5%)

a) Principle of operation
b) Accessories
c) Steps and procedures in planning the tape
d) Sequences in tool setup
e) Cutting feeds and speeds

10. Shaping and Planing Processes (5%)

a) Principles of operation - shaper - planer
b) Application - advantages and disadvantages
c) Methods of clamping regular and irregular shapes
d) Tools and accessories needed

11. Trade Computations (5%)

a) The use of reference tables, handbooks and charts as they pertain to calculations.
b) The use of formulas characteristic of the occupation
c) Calculations applicable to the work of the occupation

12. Application of Science (5%)

a) The theory and underlying principles of mechanical advantage
b) Effect of heat and friction
c) Elements of electricity, magnetism,
d) Pneumatic and hydraulic power
e) Elements of chemistry, commonly applied to the occupation

PERFORMANCE EXAMINATION

The performance part of the examination provides an opportunity for the candidate to demonstrate his level of proficiency in the manipulative skills and judgements essential to carry on the work of the occupation.

The scope of the performance part of the examination lists the skills, methods and procedures typical of the occupations from which the work sample jobs have been developed.

1. Candidates may take five hours to complete the work jobs.

2. Safety glasses are required and will be provided. Candidates may bring their own glasses.

3. Personal hand tools, such as micrometers and scales may be used.

4. Handbooks or reference materials may not be brought into the shop. They will be provided when necessary.

5. Appropriate work clothes should be worn.

6. Adherence to safety standards is mandatory.

II. SCOPE OF THE PERFORMANCE EXAMINATION

A. Trade skills, methods and procedures of operation the applicant should be able to perform:

1. Bench and Assembly, Layout and Inspection (15%)

a) Layout of work, including center, reference, contour and dimension lines, surface preparation
b) Using common hand and measuring tools, surface plate, vise and other holding or clamping devices, precision tools and gages.
c) Filing, cutting, reaming, threading, fitting, polishing and lapping
d) Testing and inspecting with precision inspection tools -- precision blocks, gages, indicators, hardness testers and comparator

2. Machine Sawing, Filing and Multiple Parts Processing (2%)

a) Set up, weld saw blades
b) Cut to a line
c) Set up and file to a line
d) Clamp regular and irregular shapes
e) Sawing and filing angular surfaces

3. Drilling, Tapping - Lapping - Machines and Attachments (8%)

a) Set up work-vise, parallels, straps and bolts, jigs and/or a combination of accessories
b) Drilling, reaming, counterboring, countersinking, lapping and tapping
c) Grind drills

4. Grinding and Precision Finishing (20%)

a) Surface grinding
b) Slot or shoulder grinding
c) Form grinding
d) Set up of work - magnetic chuck, vise, sine plate, magnetic accessories and other holding devices.
e) Selecting, truing and dressing abrasive wheels
f) Plain external and internal grinding, taper grinding
g) Cutter grinding - straight and spiral
h) Selection of coolants

5. Turning and Processing (20%)

a) Set up and operate engine and bench lathes
b) Mounting of work, chucks, between center, collets, face plates
c) All basic external and internal turning operations
d) Taper turning, all methods
e) Drilling, reaming, tapping, boring, recessing
f) Turning long and thin stock using follower and steady rest
g) Sharpen all cutting tools

6. Milling Processes and Machines (20%)

a) Set up and adjust proper feeds and speeds
b) Set up and operate the dividing head and rotary table-set up for simple and compound indexing
c) Set up vise and other holding devices for holding regular and irregular shapes
d) Set up for various milling operations - slotting angle milling, and milling, spiral milling graduating
e) Set up for climb milling

7. Electronic Control Operations - optional (5%)

a) Set up tools in proper sequence
b) Adjust machine for feed and speed
c) Mount tape and make a trial run
d) Make a tape through numerical operation

8. Planing and Shaping (5%)

a) Set up work and tools

a-1 Plain surfaces
a-2 Angular surfaces
a-3 Contour shapes
a-4 Slotting and serrating
a-5 Cutting steps

9. Material Treatment and Testing (5%)

a) Hardening, tempering
b) Annealing, normalizing
c) Packhardening -- Carburizing
d) Testing for hardness

Candidates are advised to read all directions carefully before taking either the written or the performance examinations, and prepare all materials and supplies specified.

• EXAMINER'S PERFORMANCE EVALUATION SCALE - MACHINE TRADES

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY EXAMINATION

Candidates Name_____ No._____

Location_____ Date_____

While the candidate is performing the assigned tasks, rate his performance according to the scale indicated for each subdivision. The top rating would be equivalent to an extremely able or competent worker. A good or above average worker would be rated 2 or 3 points below the top rating. The average worker rates at the midpoint. Workers with below average performance would rate 2 or 3 points below the midpoint, and the inept worker rates to zero. After he has completed the task, grade his finished product according to the dimensions specified, deduct points for variations beyond normal tolerances. Check any weaknesses in box provided.

Bench & Layout Inspection

Observed Performance	Rating 0-10	Finished Product	Rating 0-10
( ) Handling of layout tools		( ) Accuracy	
( ) Planning of layout procedure		( ) Dimension Lines	
( ) Preparation of surfaces		( ) Centers of holes	
( ) Filing - center marking		( ) Sizing holes	
( ) Tapping			
( ) Other tools	( )		( )

Engine Lathe

Observed Performance	Rating 0-10	Finished Product	Rating 0-15
( ) Set up of work		( ) Accuracy	
( ) Set up of tools		( ) Finish	
( ) Set up of accessories		( ) Knurls	
( ) Operation of lathe		( ) Other	
( ) Feed - speed	( )		( )

Milling Machine

Observed Performance	Rating 0-15	Finished Product	Rating 0-15
( ) Set up of work		( ) Accuracy	
( ) Set up of cutters		( ) Finish	
( ) Set up of accessories		( ) Squareness	
( ) Feed and speed		( ) Appearance	
( ) Safety procedures	( )	( ) Burrs, marks, etc.	( )

Heat Treatment

Observed Performance	Rating 0-5	Finished Product	Rating 0-5
( ) Proper handling of part		( ) Proper hardness	
( ) Quenching procedure		( ) Proper temp. color	
( ) Tempering procedure			
( ) Safety	( )		( )

Drill Press

Observed Performance	Rating 0-5	Finished Product	Rating 0-5
( ) Manner of clamping work		( ) Size of holes	
( ) Use of vise-parallels		( ) Location of holes	
( ) Use of tapping attachment	( )	( ) Removal of burrs	( )

Grinding

Observed Performance	Rating 0-15	Finished Product	Rating 0-15
( ) Set up of work		( ) Accuracy	
( ) Trimming of wheel		( ) Finish	
( ) Sequence of steps		( ) Squareness	
( ) Selection of wheels		( ) Forms and radii	
( ) Feeds and speeds		( ) Tool bits	
( ) Dressing of wheels		( ) Drills	
( ) Posture			
( ) Coolants			
( ) Safety practices	( )		( )

Planer - Shaper

Observed Performance	Rating 0-8	Finished Product	Rating 0-8
( ) Set up of work		( ) Accuracy	
( ) Set up of tools		( ) Finish	
( ) Feeds and speeds		( ) Other	
( ) Safety factors	( )		( )

Rating - Observed Performance _____

Rating - Finished Product _____

Rating - Overall _____

Examiner's Signature_____

(Give your personal impression of the candidate on the back of the sheet.)

Inept - Out of practice

Below average or limited facility

Average worker

Good, above average

Extremely able, competent worker

Please state your overall impression of the candidate below:

_____

_____

_____

_____

_____

_____

Examiner's Signature _____

• EXAMINER'S PERFORMANCE EVALUATION SCALE
ELECTRONICS-COMMUNICATIONS

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY TEST

Candidate's Name and Number _____

Place _____ Date _____

While the candidate is performing the assigned tasks, rate his performance on each job on the scale shown below, indicate any weaknesses in the last column.

The candidate should be rated on two features of his performance: a) his work methods and b) the finished job. The following seven aspects of his work methods are to be used:

1. Does he approach the identification and location of the trouble systematically in a step-by-step manner?
2. Does he use the accepted trade method in correcting the trouble?
3. Does he select test equipment properly?
4. Does he perform hand-tool operations skillfully?
5. Does he work neatly, accurately and safely?
6. Does he work at an acceptable speed?
7. Does he avoid excessive and inappropriate use of reference material?

In assigning ratings to the job performance, remember that the scores indicated are maximum and should be given only to the extremely competent candidate (for a breakdown see the back of the sheet).

	Work Methods and Finished Job	Max. Score	Jobs 1	2	3	4	5	6	7	8	Comments: Weaknesses
a-1	Procedure in identifying and locating trouble	20									
2	Method of correcting trouble	15									
3	Selection & use of test equipment	10									
4	Skill of hand tool operations	10									
5	Neatness, accuracy and safety of work	5									
6	Speed	5									
7	Use of reference materials	5									
	SCORE FOR WORK METHODS	70									
b-	SCORE FOR FINISHED JOB	30									
	Total Score	100									

Final Score = $\frac{\text{Add all columns}}{\text{No. of Jobs}}$

Final Score: _____

Examiner's Signature_____

RATING DISTRIBUTION

4 - Worker inept or out of practice

8.- Worker with below average and limited facility

10 - Average worker in the field

16 - Good or above average worker

20 - Extremely able, highly competent worker

The same relationship should prevail when the maximum scores are 15 or 10 or 5.

These are just estimated average values, a rater should go above or below these figures if his judgment so indicates.

Please state your overall impression of the candidate's competence as a worker in the field, in addition to the numerical score.

APPENDIX I

• ESTABLISHMENT OF A NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

Plaza Seven Office Building 1202 Route 7
Latham, N. Y. 12110 Phone (518) 785-1524

Dr. C. Thomas Olivo
Director

Dr. Adolph Panitz
Associate Director

March 12, 1973

TO: Planning Committee and Administrative Board

FROM: Dr. C. Thomas Olivo, Director

SUBJECT: Final meeting of Planning Committee - National Occupational Competency Testing Project

The Executive Council, Administrative Board, Planning Committee, Principal Investigators and Staff for the National Occupational Competency Testing Project will meet in Las Vegas, Nevada from April 8 to 10. The Executive Council will hold its meetings on Sunday night, April 8 and Tuesday afternoon, April 10.

The joint meeting of the Administrative Board, Planning Committee and Staff will take place on Monday morning and afternoon, and Tuesday morning, April 9 and 10, respectively. The morning meetings will begin at 9 a.m. and will be held at the Holiday Inn on Center Strip (3475 Las Vegas Blvd., South) (702-732-2333).

We were able to get only a limited number of rooms at the Holiday Inn. So, if you have a preference for another location, feel free to make your own reservations. You will be billed for the room unless you cancel the reservation by April 3. Expenses incurred for the meeting will be payable according to the provisions which prevail either at your Institution or State Department. Will you advise me of your plans.

Please refer to my letter of February 12 with the attachments; these will deal essentially with the major Agenda items to be covered.

Dr. Milton Larson, Chairman of the Executive Council, will conduct the meetings. He has advised that additional Agenda items will be included at your suggestion.

Will you advise me as to whether or not you will be able to attend the meeting. Members of the Administrative Board (outside of the Executive Council) and the Planning Committee should be able to leave Las Vegas the afternoon of April 10, if they so desire.

Cordially,

C. Thomas Olivo

C. Thomas Olivo
Director

CTO:mo
attachment

Principal Investigators

Dr. Carl Schaefer
Rutgers University, New Jersey

Dr. Melvin Barlow
University of California, Los Angeles

Dr. Richard Nelson
State Department of Education, Sacramento

"Consortium for Occupational Competency Testing of Trade and Industrial/Technical Teachers." Research Project Grant 8-0474, Bureau of Research, United States Office of Education to the Graduate School of Education, Rutgers University.

• ESTABLISHMENT OF NOCT INSTITUTE; ORGANIZATIONAL STRUCTURE; ADMINISTRATIVE GUIDELINES AND POLICIES

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

EXECUTIVE MEETING NO. 2

Las Vegas, Nevada - April 8, 9 and 10, 1973

Participants:

- Executive Council
- Administrative Board
- Principal Investigators
- Planning Committee
- Project Associate Director and Project Director
- Ex-Officio: Project Officer (USOE)
  Representative NASDVE

Chairman . . . . . Dr. Milton Larson

Proposed Agenda

I. NOCT Institute for Vocational Industrial/Technical Education

A. Conceptualizing a National Occupational Competency Testing Institute
B. Establishing functions of the NOCT Institute
C. Planning the organizational structure

1. Initial organization for vocational industrial/technical education (trades and industries)

2. Reorganization models for possible expansion to other vocational fields

D. Approving guidelines for policies
E. Approving NOCT Institute Incorporation and By-Laws
F. Phasing out original Planning Committee
G. Appraising Administrative Board membership; duties and qualifications
H. Reviewing NOCT Institute Proposals and approving a Contract

II. NOCT Institute Membership and Conditions

A. Appraising guidelines for membership
B. Approving formal documents for membership

III. NOCT Institute Test Centers

A. Reviewing and approving guidelines for identifying and certifying NOCT Institute Coordinators
B. Authorizing coordinators to conduct testing functions
C. Approving Area Test Centers (with time limitations)

IV. Fiscal Management

A. Exploring financial arrangements among Consortium members
B. Establishing guidelines for financial management and accounting

V. Schedules of Meetings and Agendas

A. Executive Council and Institute Director
B. Administrative Board
C. Consortium of States

VI. Accountability of Regional Representatives on the Administrative Board

A. Qualifications and responsibilities
B. Developing communication and feeder system to Consortium members

VII. Other Suggested Agenda Items

THE NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE

• CONSTITUTION

Article I - Name

The name of the organization is: "The National Occupational Competency Testing Institute"; hereinafter referred to as NOCTI or The Institute.

Article II - Purposes

The National Occupational Competency Testing Institute purposes include, but are not limited by, the following:

A. To provide occupational competency testing materials and services to the various states and teacher education institutions (colleges and universities engaged in preparing occupationally competent persons for teaching, supervisory, administrative or other leadership positions in vocational education).

B. To improve or supplant existing performance and written occupational competency tests and to develop new ones.

C. To establish and approve Test Centers and to develop Test Coordinators and Test Examiners.

D. To produce, distribute and administer tests and to score, analyze and disseminate test results.

E. To conduct further research and development activities in occupational competency testing.

F. To conduct field studies and evaluations and to prepare reports and related documents.

G. To perform ancillary and related service functions with educational and non-institutional organizations that are dealing with any aspect, process, product or application of occupational competency testing.

H. To secure external financial support to perform the work of the Institute.

I. To undertake any and all activities necessary, suitable and proper for the accomplishment of these purposes — nationally or internationally — or to pursue any program of action concerning allied fields of professional endeavor.

Article III - Membership

A. Consortium Membership - The voting membership of the Institute shall consist of one individual identified by each State Director of Vocational Education, who serves within the respective state as the head, trade and industrial education supervisor or head, trade and industrial teacher trainer; or other qualified person in trade and industrial/technical education. Other conditions for voting membership require that the State accepts the purposes of the Institute, utilizes its services and agrees to participate in an annual meeting of the Consortium. Consortium membership continues until the State Representative is superseded by a replacement designated by the State Director or other appropriate state officer.

B. Participating Membership - The products, processes and services of the Institute may be provided within states and territories that are not Consortium members upon written notice by the Administrative Board that an interested professional organization is qualified, approved, and shall serve the functions of the Institute. An original and/or a subsequent written approval for participating membership may extend for a period not exceeding two years. Each renewal requires approval by the Administrative Board. Participating members are nonvoting members.

C. Administrative Board Membership - Ten regional representatives and other ex-officio members constitute the membership of the Administrative Board, except during the first three years of organization when Board membership shall be staggered to achieve this plan.

Each established region shall be represented by one Consortium member elected from the Consortium members of the region to serve a three-year term on the Administrative Board.

Election shall take place at the time of the annual meeting. The Executive Council is empowered to fill any unfilled position on the Administrative Board until a successor may be elected at the next annual meeting.

Ex-officio membership on the Administrztive Board shall include The Institute Program Director, a representative of the National Association of State Directors of Vocational Education, the executive director of the National Association of Trade and Industrial/Technical Education, a representative of the Vocational Industrial Clubs of America, and the Assistant Program Director who represents the contract organization for occupational competency testing.

D. Board of Trustees Membership - Membership on the Board shall be continuous but under a plan of rotation whereby one member is replaced annually.

The permanent organization of the Board of Trustees shall consist of seven members: three current officers of the Executive Council, the Institute Project Director and three members who shall have completed terms in office as Chairman of the Executive Council. All Trustees are voting members.

Vacancies on the Board of Trustees shall be filled temporarily by the Administrative Board, subject to confirmation at the annual Consortium Meeting.

E. Executive Council Membership - This Council includes three officers and additional ex-officio members.

The voting members are the officers. Officers shall fill a three-year term, except in the first instance when the terms shall be one, two and three years to effect a rotational plan. The Council Officers are elected at the annual meeting of the Administrative Board by majority vote of those members present or designees holding written proxy.

In the rotational plan, the Chairman of the Executive Council, upon completion of term of office in December 1974 shall continue as a Trustee on the Board of Trustees; the Vice-Chairman shall become the Chairman of the Council; the Secretary-Treasurer, the Vice-Chairman. A new Secretary-Treasurer shall be elected annually beginning in December 1974.

The ex-officio members, without voting rights, include the Institute Director, the representative to the Administrative Board from the National Association of State Directors of Vocational Education, the executive director of the National Association of Trade and Industrial Education, and the Assistant Program Director who represents the Contract Organization for occupational competency testing. The ex-officio members shall serve in an advisory capacity to the Council.

F. Membership Year - The membership year shall be the calendar year January 1 to December 31.

Article IV - Fees, Budget and Program Approval

Services and goods provided by the Institute to participating members shall be established at a cost-plus rate as approved by the Administrative Board and Consortium.

Out of the sums paid by Consortium members for programs and services provided by the Institute through a contract organization, a maintenance and administration budget shall be provided through the Executive Council. The contract organization for the National Occupational Competency Testing Institute shall include within the budget for the program and services a limited amount to cover, primarily, communication costs of the Executive Council and the Administrative Board.

The total budget and conditions as recommended to the Administrative Board by the Executive Council, as developed cooperatively with the contract organization, shall be prorated according to potential services to be provided each state. Such monies shall be paid into a special account established by the contract organization. The recommended budget and any related financial considerations shall be subject to final approval by the Administrative Board at its annual meeting.

The annual fiscal year shall be from January 1 through December 31 of each year. The contract organization shall be responsible for maintaining appropriate financial records for all programs, services and activities as defined in the contract with the Institute.

Article V - Officers and Directors

The four leadership bodies of the Institute include: the Consortium of States, the Administrative Board, the Executive Council, and the Board of Trustees of the Incorporated organization. The Executive Council Officers shall serve as the officers of each of the four bodies.

A. The officers of the Executive Council, Administrative Board, Consortium of States, and the Institute Board of Trustees shall include a Chairman, a Vice-Chairman and a Secretary-Treasurer.

1. The Chairman of the Executive Council shall serve as the chief officer at all meetings of the Consortium of States, the Administrative Board, the Executive Council and the Institute Board of Trustees. In addition, the Chairman shall serve as the liaison officer with the contract organization.

2. The Vice-Chairman shall serve in the absence of the Chairman. The Vice-Chairman (or a designate) shall represent the Executive Council on any special committees appointed by the Council or the Board. All appointments to such committees shall be made by the Chairman.

3. The Secretary-Treasurer shall:

   a. Review all credentials of States and Administrative Board Members and recommend their eligibility to the Administrative Board;

   b. Prepare agendas in advance, carry on a reporting function to keep the membership informed, and maintain necessary records; and

   c. Recommend disbursements for meetings and communications of the Executive Council and the Administrative Board as approved in the budget.

B. Qualifications of Officers

1. The Officers shall be nominated at an annual meeting of the Administrative Board to serve terms herein before defined. The nominations shall be approved by the Consortium of States.

2. To hold office or to serve on the Administrative Board, the member must hold voting membership rights as identified in Article III, must be professionally employed within the region from which a member to the Administrative Board is to be elected, and must have participated actively in occupational competency testing in vocational trades and industrial education.

3. An officer of the Council or a member of the Administrative Board whose conditions of employment change so as to render him ineligible under provisions of Article III may, at the discretion of the Administrative Board, continue in office for one year or be replaced.

Article VI - Administration and Policy

A. The Consortium of States shall designate broad parameters to guide the Administrative Board in establishing policies and operating procedures. Resolutions adopted at the annual meeting shall be implemented by the Administrative Board.

B. The Administrative Board shall be the policy-making body, shall develop guidelines for program planning and administration, and shall be accountable for the overall program, services and budget of the Institute.

C. The Executive Council shall exercise the administrative control of the Institute within the guidelines and budget as approved by the Consortium and consistent with policy established by the Board. The Council is responsible for the control and administration of the Institute program and services.

D. The Trustees of the Institute shall constitute the legal body, shall act according to the powers granted by the Constitution and Consortium, and shall be responsible for negotiating contracts, evaluating the Institute program and services, annual reporting to membership, program development and extension, and for performing such other administrative activities essential to accomplishing the Institute purposes.

E. Motions and actions, consistent with the responsibilities of each of the four bodies, shall be approved by majority vote of the members present or represented by written proxy at a formally announced meeting of the Consortium of States, Administrative Board or Executive Council, as may be required.

Article VII - Amendments

Amendments to this Constitution shall be proposed by the Administrative Board for action at the annual meeting of the Consortium of States. A written notice shall be given to the Consortium Members, at least, twenty-one (21) days prior to the annual meeting. A two-thirds majority of the eligible voting members present or represented by written proxy shall be required to adopt an amendment.

Constitution approved by Administrative Board at Las Vegas, April 10, 1973. Corrections and recommendations of Administrative Board as contained in this draft were approved by Executive Council at New Brunswick, New Jersey on May 24, 1973.

Subject to ratification by Consortium in December 1973

NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE

• BY-LAWS

Article I - Membership Eligibility

A. Membership in the Institute is reserved for vocational education units of State Departments of Education and/or teacher training institutions meeting the following criteria:

1. The organization and purposes shall be compatible with the Institute Constitution.

2. A written application shall be filed for Consortium membership or participating membership.

3. Agreement to abide by the conditions of membership shall be stipulated.

4. Membership shall be subject to approval by the Administrative Board in accordance with the Institute Constitution and By-Laws.

Interim Administrative Board and Executive Council Membership

B. The original Project Director, Associate Project Director, remaining three Principal Investigators, and the USOE Project Officer shall serve on both the Administrative Board and Executive Council until December 31, 1974. Thereafter, only the officers, members and ex-officio members designated in Article III-C of the Constitution shall serve on the Administrative Board and Executive Council.

Article II - Professional Affiliation

A. The National Occupational Competency Testing Institute is an affiliate of the National Association of Trade and Industrial Education, hereinafter referred to as NATIE.

B. All actions of the Consortium of States, Administrative Board, Executive Council and Board of Trustees shall be in consonance with and in support of the purposes of NATIE.

Article III - Meetings

A. The time and place of the annual meetings of the Consortium of States, the Administrative Board, and Executive Council shall coincide with the annual meeting of NATIE. The time and place of the annual meeting of the Board of Trustees shall be determined by that body.

B. Other meetings of the Trustees, Executive Council, Administrative Board and Consortium of States shall be mutually determined by these groups, and where applicable, cooperatively between the contract organization and the Executive Council.

Article IV - Committees

A. Committees shall be established with the approval of the Administrative Board to serve written functions for a defined period of time.

Article V - Institute Development and Extension

A. The process, products and services; the organizational structure of the Institute, and the conditions of contract may be changed to accommodate other program fields in vocational education in which activities compatible with the purposes of the original Institute and NATIE are planned.

B. Conceptualized models, considered in the original planning for the Institute, which identify such reorganization to accommodate other program fields and a Board of Governors may form the foundation for reorganization.

Article VI - Honorary Memberships and Citations

A. Honorary Memberships and appropriate citations shall be conferred at the annual meeting to any member, voting or ex-officio, who has provided outstanding, distinguished service in accomplishing the purposes of the Institute.

Honorary Memberships shall be conferred to Trustees and members of the Executive Council and/or Administrative Board upon completion of a term in office.

Honorary Memberships shall be recorded. Honorary Members shall have all the rights of membership, except those of voting.

Article VII - Amendments to By-Laws

A. Amendments to these By-Laws shall be proposed by the Administrative Board and may be adopted after written notice has been filed with the Consortium of States membership at least twenty-one (21) days prior to the annual meeting. A majority vote of eligible voting members present or represented by written proxy at the annual meeting shall be required to adopt an amendment to these By-Laws.

Article VIII
Effective Date of Constitution and By-Laws

A. The Constitution and By-Laws shall become effective when ratified by majority vote of the eligible members of the Consortium of States who are present and voting at the first annual meeting.

NATIONAL OCCUPATIONAL COMPETENCY TESTING INSTITUTE

• OPERATING POLICIES

Section I - INSTITUTE MEMBERSHIP AND CONDITIONS

A. Institute Structure and Eligibility for Membership

Membership in the National Occupational Competency Testing Institute (NOCTI) is reserved for vocational education units of State Departments of Education and/or teacher training institutions whose

(1) Organization and function are compatible with the Constitution of the Institute; who

(2) Submit a written application for membership or for participation in the program and services of the Institute; who

(3) Agree to abide by the conditions of membership, and whose

(4) Membership is approved by the Administrative Board according to criteria established for this purpose.

The Department and/or Institution(s) membership is provided through an individual designated to represent the Department and/or Institution.

The structure and membership of the N.O.C.T. Institute may be extended to include other vocational education fields as provided for in the Constitution and By-Laws.

B. Responsible Bodies Within the N.O.C.T. Institute

1. The controlling body for the N.O.C.T. Institute is the Consortium of States in which each participating state has one representative. The Consortium develops broad guidelines for policy making through resolutions which it passes at the annual meeting.

2. The Administrative Board, consisting of regional representatives of each of ten regions, is the policy-making body and carries on budget approval and other functions which implement policy.

3. The administrative direction and control of the N.O.C.T. Institute is vested in the officers comprising the Executive Council for the Consortium, Administrative Board, and the Board of Trustees.

4. The Board of Trustees legally represents the Corporate Body of the Institute. The Board's responsibilities are circumscribed by the powers granted to it by the Institute. The Board of Trustees serves management and advisory functions relating to (but not restricted to) contracts, fiscal accounting, evaluation, reporting, systems/organization analysis, program planning and budgeting, and the like.

The eight members on the original Board of Directors shall serve according to the following schedule:

(a) July 1, 1973 - The Associate Project Director will be recognized on the Board of Trustees as the N.O.C.T. Institute Director.

(b) January 1, 1975 - Principal Investigators (1) and (2) shall have completed their terms in office. The retiring Chairman of the Executive Council will replace the two Investigators, reducing the eight-member Board to seven members.

(c) January 1, 1976 - Principal Investigator (3) shall have completed his term in office and will be replaced by the Executive Council Chairman who completes his term in office on that date.

(d) January 1, 1977 - Principal Investigator (4) shall be replaced as in (c) above.

(e) Annually, thereafter, except for the Institute Director who is a permanent member, one member of the Board shall be replaced.

Responsibilities, organization, officers, terms for membership to the Consortium, Administrative Board, Executive Council and Board of Trustees are further defined in the Constitution and By-Laws.

C. Conditions of Membership

The State Director of Vocational Education may designate the head state supervisor or teacher trainer for trade and industrial education, or an authorized institution whose purposes are similar to those of the N.O.C.T. Institute, to serve as a member of the Institute for the state or a portion of the state. Membership shall be continuous or may be changed as provided for within the Constitution.

The State Department or an authorized institutional representative shall be considered for membership to represent the state, or portion thereof, when the state or authorized institution agrees to:

(1) Support the program and services and to use the materials developed for the Institute members as related to the occupational competency testing of trade and industrial/technical teacher candidates;

(2) Utilize the Institute performance and written examinations according to the purposes and conditions established for each part;

(3) Maintain the integrity of the examinations and use them solely for the purposes intended;

(4) Assure the security of each examination and to return all test items and test materials without duplication by any process whatsoever;

(5) Consider and utilize the results of scoring, analysis, and research as may be in the best interest of the state. Further, to participate in researching the processes and products of the Institute to continuously insure the validity and reliability of the program and services;

(6) Use the products of the Institute in occupational areas where tests have been developed and are available from the Institute;

(7) State its intent to financially support the program and services at a specified level. In return, the state or institution is guaranteed a specified number of tests and services. It is understood that the costs per test are to be established by the Consortium of States;

(8) Cooperate with contiguous states and institutions when the interests of the area may be better served (greater educational productivity) through such cooperative testing activities; and

(9) Finally, advise the N.O.C.T. Institute one year in advance of any date when the state or institution may desire to terminate its membership.

D. Action Upon Membership

Upon written application to the N.O.C.T. Institute, the Administrative Board shall evaluate each request according to the conditions of membership hereinbefore stated. In the event that a number of institutions within a state make application, the Administrative Board shall determine which organization(s) or institution(s) may best serve the membership of the Consortium, and shall act accordingly. In arriv-

ing at such a determination, consideration shall be given to the conditions and criteria for approving the establishment of National Occupational Competency Testing Centers and the approval of National Occupational Competency Testing Center Coordinators.

The recommendations and actions of the Administrative Board shall be made a matter of record.

Section II - DUTIES OF CONSORTIUM REPRESENTATIVES AND REGIONAL REPRESENTATIVES ON THE ADMINISTRATIVE BOARD

A. State Representatives to the Consortium

Membership to the Consortium of States consists of a single representative from each state whose application is approved by the Administrative Board according to conditions established by the Constitution and By-Laws.

In instances where more than one agency within a state is participating in the program and services of the National Occupational Competency Testing Institute, either the State Director of Vocational Education or an institution named by the State Director shall designate the individual who is qualified to represent that state in the Consortium. If either fails to act, the Administrative Board, in consultation with the State Director of Vocational Education, may select an individual on an interim basis.

B. Duties of Consortium Representatives

The duties of the state representative to the Consortium relate to services within the respective state and, in a broader context, to the Administrative Board and to the Consortium.

1. The state representative is the sole liaison agent between all participating units of the State Department of Education and institutions within the state and the Consortium.

2. The state representative serves a communication function in transmitting information and reports which relate to the establishment of policies, operating procedure, priorities, programs, etc. to the Consortium, and

3. The state representative serves a coordinating function identifying the needs for programs and services within the state, establishing how these may be supported and arranging through the Consortium to provide them.

4. The state representative is responsible for drafting resolutions compatible with the Constitution and By-Laws (or revisions thereof) as guidelines for Administrative Board to develop policies.

5. The state representative serves a legislative function in exercising voting rights within the Consortium. If elected as a regional representative on the Administrative Board, the individual represents the region and acts on behalf of the member states.

6. The state representative serves a reporting and public relations function keeping the State Director and participating organizations informed.

C. Duties of Regional Representatives to the Administrative Board

The Administrative Board is the policy-making and budget approving body and serves regulatory and administrative functions. The Board includes ten regional representatives each of whom is elected by the State Consortium members from the respective region. In consonance with the Board's functions, the regional representatives perform the following duties:

1. Representation. On all matters affecting the regions, the regional representative acts independently of the state he represents in expressing the position of the region. At other times, the representative makes decisions in the best interests of the Consortium.

2. Dissemination. While all actions of the Administrative Board are a matter of record and the information is disseminated through the state representatives to the Consortium, the Board members interpret these actions and actively promote the program and services in each region.

3. Coordination. Those activities and services which require the collective efforts of the states within a region are coordinated by the regional representative.

4. Participation. The schedule of the regional representative provides for the conduct of regional activities, attendance at the annual meeting coinciding with the American Vocational Association and attendance at one or more special Administrative Board meetings. Note: Expenses for subsistence only for meeting one day prior to the A.V.A. Convention or expenses for any special meeting called by the Administrative Board shall be reimbursed by the National Occupational Competency Testing Institute.

Section III - CRITERIA FOR DESIGNATING AND CERTIFYING NATIONAL OCCUPATIONAL COMPETENCY TESTING CENTERS AND APPROVING REGIONAL CENTER COORDINATORS

Rationale

National Occupational Competency Testing Centers (N.O.C.T. Centers) The measurement of occupational competency of candidates seeking admission to trade and industrial/technical teacher education programs; or validating occupational competence through the satisfactory passing of a trade, industrial, industrial service, or industrial/technical occupational competency examination for certification, collegiate credit, or other purpose, requires the establishing of National Occupational Competency Testing Centers at strategic locations to serve all of the Consortium States, including Puerto Rico.

A. Definitions

The designation and certifying of each Regional Occupational Competency Testing Center ensures Consortium members that candidates may be tested under the most favorable conditions in specially selected shops and laboratories and under the supervision of competent and approved test coordinators and examiners. Further, a Regional Occupational Competency Testing Center is designated with due consideration to geography, economic efficiency and feasibility to accomplish the testing objectives in a fair and judicious manner.

A Regional Occupational Competency Testing Center serves a state or a part of the state in which it is located. In addition, a Regional Occupational Competency Testing Center may serve contiguous states or parts of states when their mutual needs and interests may be best served through such an arrangement and all parties mutually agree to band together for such purposes.

A Regional Occupational Competency Testing Center may provide services in one or more locations, depending on the occupational areas in which candidates are to be tested and the accessibility of shops and laboratories with sufficient equipment, tools, instruments, etc., necessary to effectively measure occupational competency. Thus, occupational competency performance tests may be administered for a geographic area in a number of facilities and locations. Some may be institutional; others may utilize shops, laboratories, or other facilities within industry.

The designation of each Regional Occupational Competency Testing Center shall be made by the Institute Program Director (permanent staff) by defining geographic areas which may best serve interests of the Consortium. The final designation, approval and certifying of each Regional Testing Center shall be the responsibility of the Administrative Board. The Board shall use the criteria which follow in making such determinations.

Approval of each Regional Testing Center shall be for a period of two years, unless earlier terminated by mutual consent. Formal notification of action shall be forwarded to the representatives of the states to be served by each Center. Additional Regional Testing Centers may be established whenever the need arises and it is feasible, desirable and in the best interests of the Institute.

B. Regional Occupational Competency Testing Center Coordinators

The Coordinator is the person authorized to carry on all functions of the N.O.C.T. Institute within the geographic area served by the Regional Testing Center. The Coordinator acts in concert with the Institute Program Director to insure that all activities and services incidental to the testing and reporting of test results to state representatives served by the Regional Testing Center are carried out. The Regional Testing Center Coordinators are approved by the Administrative Board.

While the Coordinator is responsible for the Institute's occupational testing activities, the Coordinator may recruit other qualified and occupationally competent persons to serve as examiners, proctors and in similar activities. The Regional Testing Center Coordinator serves also as the liaison between the state representative served by the Center, the Institute Program Director, the Administrative Board and the Consortium.

C. Criteria for Designating and Certifying Each Regional Occupational Competency Testing Center

1. The interests of Consortium members in a geographic area are best served by establishing a central location where qualified personnel and excellent physical facilities (shops, laboratories and related areas) are available to administer both the performance (practical) and the written (theory) parts of most of the occupational competency tests, and to provide these services efficiently and with economy.

2. The Regional Occupational Competency Testing Center is accessible for particular times when testing is needed and candidates are available. The location causes no undue hardship on the Consortium representatives or the candidates.

3. Satellite locations may be utilized by mutual assent of the Consortium representatives and the Regional Testing Center Coordinator when the Coordinator certifies that all physical conditions, equipment, supplies, and test administration may be carried on according to guidelines established in the "Directions to Test Coordinators and Examiners" and in the "Scope of the Examination for the Candidates".

4. Agreements may be reached by all concerned parties to permit the use of the Regional Testing Center under the coordination of the National Occupational Competency Testing Center Coordinator.

D. Criteria for Identifying and Approving Regional Occupational Competency Testing Center Coordinators

Note: Persons who are to serve as Regional Testing Center Coordinators are certified in writing by the Administrative Board.

1. The Regional Testing Center Coordinator shall be either a state supervisor, or a local supervisor, or a teacher trainer who meets certification requirements (based on occupational competence in industry) to serve in such capacity in the vocational field of trade and industrial/ technical education.

2. A Regional Testing Center Coordinator shall have access to secretarial services and other resources to permit carrying out all responsibilities with dispatch. Further, the employer understands the need for professional cooperation within the region and is agreeable to having the Coordinator perform these functions.

3. A prospective Regional Testing Center Coordinator agrees to serve in such a capacity in the geographic area for a two-year period, except in those instances where the Coordinator terminates his employment earlier.

4. The Regional Testing Center Coordinator agrees to participate in a workshop or seminar for all Coordinators, possibly once a year. Expenses for such an activity will be reimbursed by the Institute.

5. The Regional Testing Center Coordinator agrees to coordinate the efforts of the Consortium representatives in the area of the Center and to serve as a liaison person with the Institute Program Director.

6. Each Regional Testing Center Coordinator shall secure the services of Test Examiners for the Center.